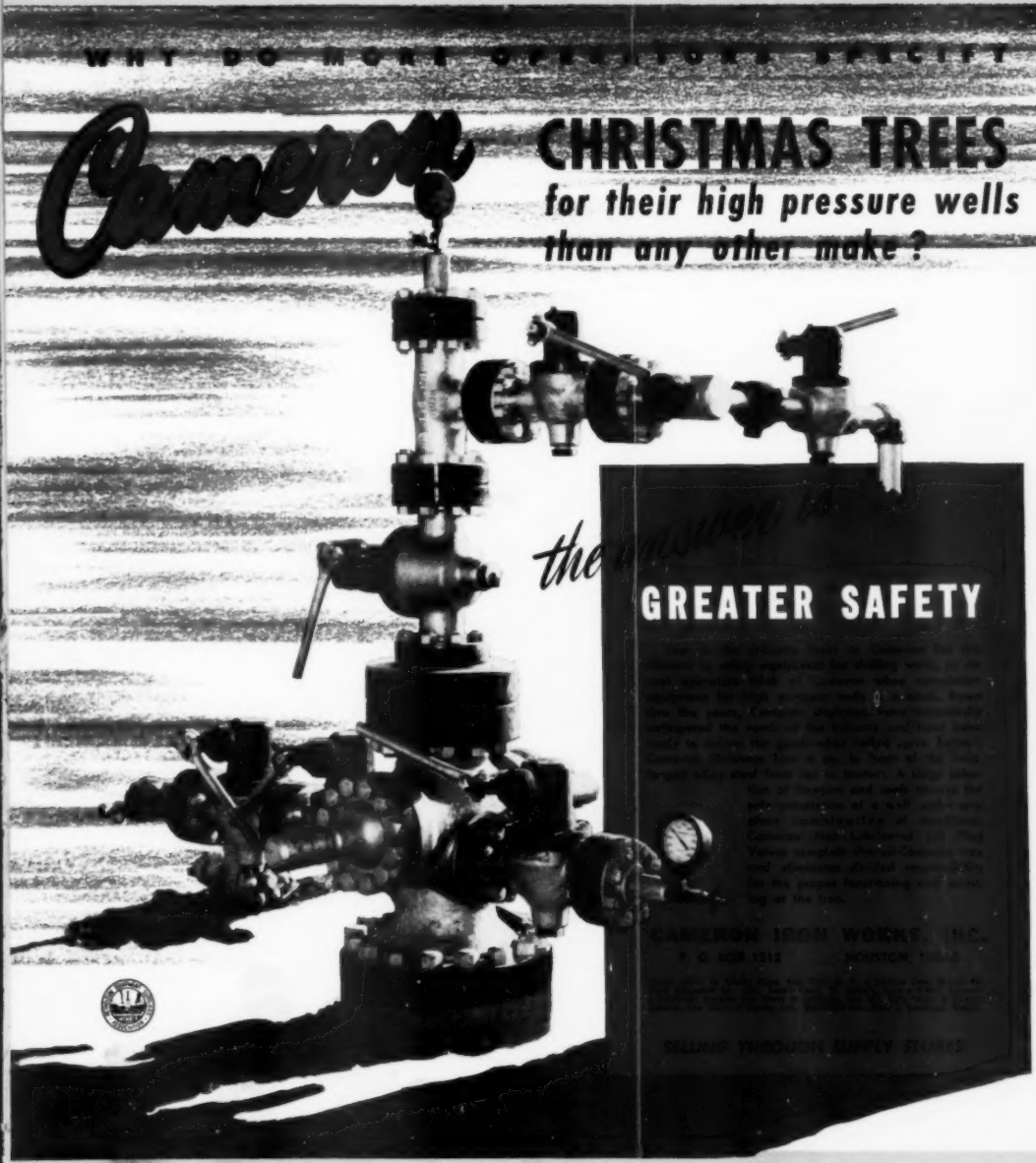
the OIL AND GAS JOURNAL

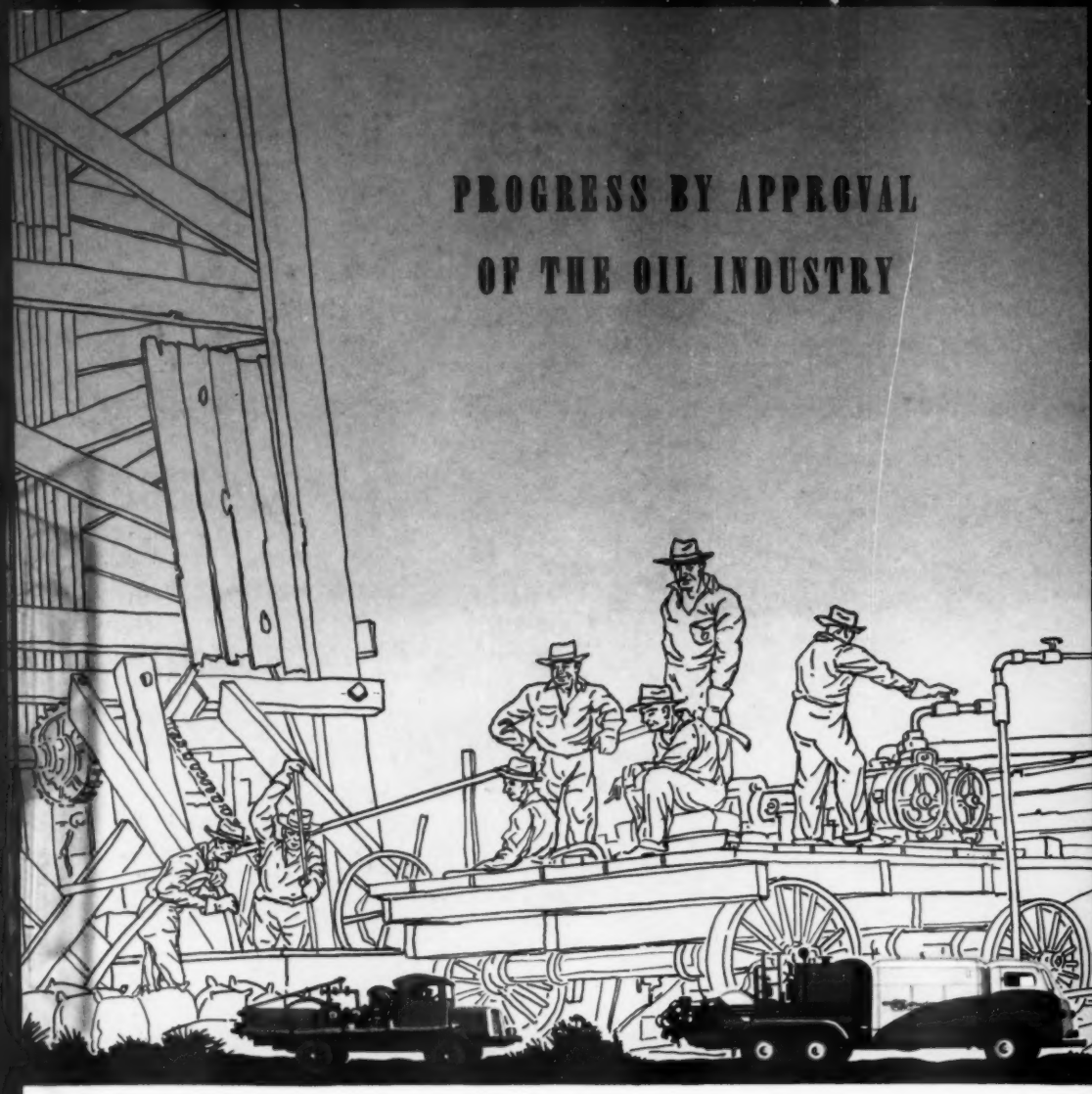
WHY DO MORE OPERATORS SPECIFY

Cameron CHRISTMAS TREES

for their high pressure wells than any other make?



PRICE 50 CENTS TABLE OF CONTENTS PAGE 51 MARCH 31, 1952



WELLS were cemented from a horse-drawn wagon thirty years ago. That's how Halliburton began. There soon proved to be a great need for the service Halliburton performed, and the oil industry gave its approval to the *quality* of Halliburton's service. Today, Halliburton is a large organization with highly-trained men and modern equipment helping to produce oil in every part of the world where wells are drilled. That's progress by consent of the industry. But, no matter how well a service is performed, or however great the demand for it, Halliburton will consistently and energetically work for further improvement of its service.

"THERE'S NO SUBSTITUTE FOR EXPERIENCE IN OIL WELL CEMENTING"

HALLIBURTON OIL WELL CEMENTING CO.

DUNCAN OKLAHOMA

To Combat Severe Stresses

use

MAYARI R PIPE

Planning a new pipeline to carry gas or oil? If you're concerned about severe stresses at the pumping stations and other special locations, use pipe made of Mayari R, Bethlehem's low-alloy, high-strength steel.

Mayari R is particularly suitable for use wherever severe stresses are encountered because it has (1) mechanical properties substantially higher than those of carbon steel, (2) a yield point of 50,000 psi minimum, and (3) an endurance limit of 50,000 psi. This steel is also highly resistant to impact and atmospheric corrosion.

In addition to pipe made from Mayari R, we also produce welded carbon-steel pipe for normal pipeline service, to Specifications API 5Lx42 and ASTM A134. Comparative weights and test pressures for all three grades of pipe are shown in the accompanying table. Additional information about steel pipe is obtainable from the nearest Bethlehem office.

Bethlehem Oil and Gas Pipe

Approximate Weight per Foot and Maximum Test Pressure

Diam. In.	¼ IN. THICK				⅜ IN. THICK				⅜ IN. THICK				⅞ IN. THICK				½ IN. THICK			
		Test Pressure psi				Test Pressure psi				Test Pressure psi				Test Pressure psi				Test Pressure psi		
	Wt lb per ft	Mayari R	API 5Lx42	ASTM A134*	Wt lb per ft	Mayari R	API 5Lx42	ASTM A134*	Wt lb per ft	Mayari R	API 5Lx42	ASTM A134*	Wt lb per ft	Mayari R	API 5Lx42	ASTM A134*	Wt lb per ft	Mayari R	API 5Lx42	ASTM A134*
**22	63	965	820	520	78	1210	1020	650	93	1450	1220	815	109	1690	1430	910	118	1935	1630	1040
24	67	885	750	475	83	1110	930	595	99	1330	1120	745	114	1550	1310	835	130	1770	1490	955
26	73	820	690	440	91	1020	860	550	107	1225	1030	690	124	1430	1210	770	141	1635	1380	880
28	79	760	640	405	98	945	795	510	117	1140	955	640	137	1330	1115	715	153	1515	1275	820
30	85	710	595	380	105	885	745	475	125	1060	895	600	145	1240	1045	670	164	1415	1190	765
32	92	665	560	355	113	830	695	445	134	1000	835	560	156	1160	975	625	176	1325	1115	715
34	97	625	525	335	120	780	655	420	143	940	785	585	167	1090	920	590	187	1250	1050	675
36	105	590	495	315	129	740	620	395	152	885	750	480	176	1030	870	555	200	1180	980	635
42	118	505	425	270	145	630	535	340	173	760	640	410	201	885	745	475	228	1010	850	545
48	135	440	375	235	168	550	465	300	199	665	560	360	231	775	650	415	263	885	745	475
60	170	355	300	190	211	440	375	240	252	530	450	285	291	620	520	335	331	710	595	380
72	210	295	250	160	259	365	310	200	306	440	375	240	354	515	435	280	403	590	497	320
84	238	250	215	135	296	315	270	170	353	380	320	205	409	440	375	240	464	505	425	270

*ASTM A283 Grade B, to be used when ordering to ASTM A134 Specification. If ASTM A283 Grade C is used instead, the test pressures may be increased by 11 pct.
**Furnished in ID only; all other sizes are OD.
Pipe can be furnished to ID or OD (except for 22-in. diam) and to intermediate diameters and greater thicknesses than shown above.
Test pressures above are based on stressing steel to 85 pct of minimum yield point:
Mayari R—85 pct of yield point = 42500 psi
API 5Lx42—85 pct of yield point = 35700 psi
ASTM A134—85 pct of yield point = 22950 psi

The following formula is used:

$$P = \frac{2tS}{D}$$

P = hydrostatic test pressure in pounds per square inch
t = tabulated wall thickness in inches
D = tabulated outside diameter in inches
S = fiber stress in pounds per square inch

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

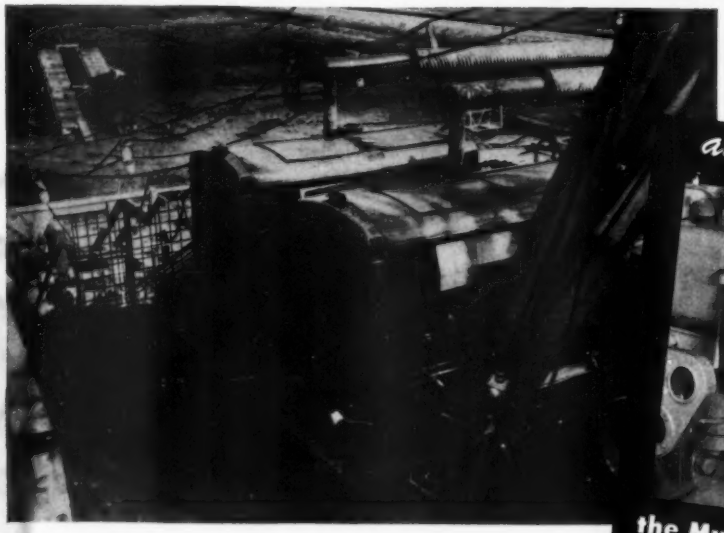
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

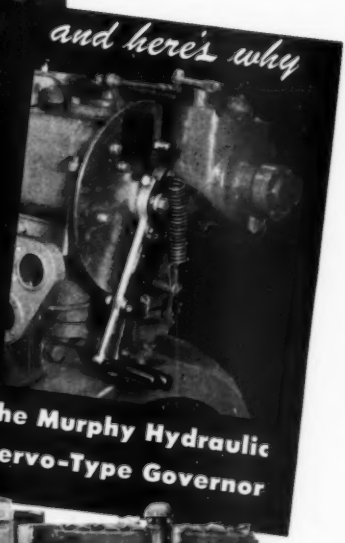
★ BETHLEHEM STEEL ★

BETHLEHEM OIL and GAS PIPE

The Oil and Gas Journal, published Mondays, copyright 1952, by The Petroleum Publishing Company. Entered as second-class matter September 1, 1910, at post office at Tulsa, Okla., under act of March 3, 1879. U. S. and foreign rates to the petroleum industry, $4 yearly.

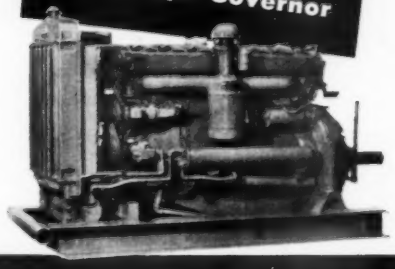
MURPHY DIESEL'S *Quick responsiveness pays off* when making hole





ONE of the most important characteristics of a really good drilling engine is its ability to take hold of a load and hold on without missing a beat . . . and that's just the characteristic of Murphy Diesels that so many drillers praise. Grant Hill, a driller on the Murphy powered Merline Drilling Company rig illustrated above says these Murphy Diesels are the most responsive power he's ever operated.

Murphy's quick responsiveness to load changes is the result of an integral hydraulic servo-type governor and other design features all of which are described in the informative booklet *"10 Questions to Ask a Diesel Engine Salesman"*. Ask your Murphy Diesel Dealer for a copy or write direct.



MURPHY DIESEL COMPANY
5305 W. Burnham St.
Milwaukee 14, Wisconsin

OIL INDUSTRY FACTORY BRANCH
Sales, Parts and Service:
113-117 South Elwood Street, Tulsa, Oklahoma

MURPHY DIESEL

Heavy duty power **for the oilfields**

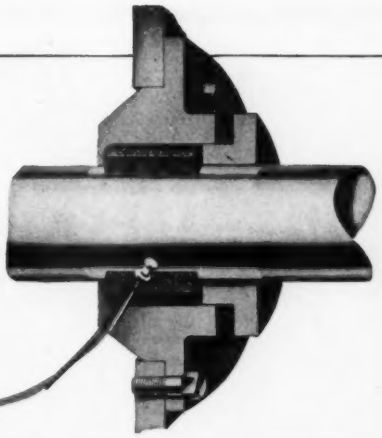
Murphy Diesel Engines and Power Units for drilling and pipe line pumping, 90 to 226 H.P., 1200 and 1400 RPM. Generator Sets, 60 to 140 K.W. Dual-Fuel Engines, 135 to 180 H.P. Also Crude Oil Burning Engines.

See Your Murphy Diesel Dealer

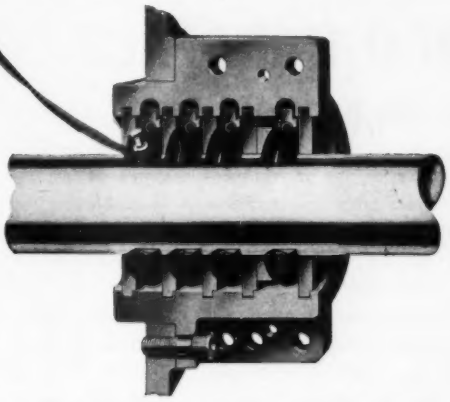
LOS ANGELES, CALIFORNIA — Engine Sales & Service
EVANSVILLE, INDIANA — Pershing Equipment Co.
EDMONTON, ALBERTA, CANADA — Northern Engine & Equip. Co., Ltd.
DALLAS & LUBBOCK, TEXAS — Conley-Lott-Nichols Mach. Co.
MT. VERNON, ILLINOIS — Ed. Meyer Tractor Co.
SAN ANTONIO, TEXAS — J. E. Ingram Equipment Co.
AMARILLO, TEXAS — Service & Supply
JACKSON, MICHIGAN — Utility & Industrial Supply
HOUSTON, TEXAS — Houston Engine & Pump Co., Inc.
GREAT BEND, KANSAS — Manufacturers Dist. Co.

COPPUS TURBINES

offer you a choice of packing rings



STANDARD METALLIC RING PACKING — Made of high grade asbestos cores encased in specially treated lubricated aluminum foil. Recommended as a low-friction, long-service packing for steam temperatures up to 850 F and back pressures up to 50 lb. Adjustable packing glands keep leakage at minimum. Easy access to packing rings.



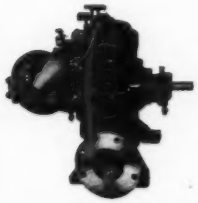
OPTIONAL CARBON RING PACKING — Consists of three carbon packing rings on the pressure side and one beyond the leak-off section. Each ring has three segments held together by a stainless steel garter spring. For back pressures up to 75 lb. Standard for vacuum or gas operation, or when leak-off is desired.

Heavy chrome plating on shaft at stuffing box is common to both types of Coppus packing.

Coppus Turbines ranging from 150 hp down to fractional in 6 frame sizes

FIT TURBINE COSTS TO HORSEPOWER NEEDS

When you buy turbines rated close to your exact horsepower needs, you save plenty of money. That's because turbines are generally priced in proportion to their size. The wide range of sizes of Coppus Turbines promises purchasing economy for you from the 150 hp size down to the smallest. As for operating and maintenance economies, you get them, too, from such other features as: greater number of manually operated valves for individual control of steam nozzles; replaceable cartridge-type bearing housings and others. For complete details . . .



WRITE FOR BULLETIN 135
COPPUS ENGINEERING CORPORATION
264 Park Avenue
Worcester 2, Mass.
Sales offices in THOMAS' REGISTER

COPPUS "BLUE RIBBON" TURBINES

AIRCO HARDFACE-LIFTING

makes old parts new . . . and new parts better

With today's delays in replacements, dollars offer less and less protection when tools or equipment wear out. No chance of cut-backs, or loss of day-to-day production, if wearing areas are fully protected with Airco Hardfacing Alloys . . . new parts and old stay on the job longer—even at peak production.

No matter what the part, or tool . . . fishtail bits . . . roller bits . . . core heads . . . wall scraper blades . . . drag type drilling bits . . . their life is extended many times by using Airco Tung Tube.

There are more than fifteen types of Airco Hardfacing rods available . . . for protection from every type of wear. Two other alloys widely used in oil field service are Aircoloy 1 and 6, for hardfacing equipment to resist corrosion and temperatures above 700°F. Both alloys have been built to resist abrasion at high temperatures.

Wear is a serious problem in your operations! It will pay you to investigate Airco Hardfacing Alloys. An Airco representative will be glad to give you complete information. Get in touch with your local Airco office today.

a few AIRCO hardfacing alloys

AIRCOLOY® No. 1

A non-ferrous, hardfacing alloy consisting of cobalt, chromium and tungsten . . . excellent corrosion resistance . . . retains hardness and wear resistance even at red heat . . . cold hardness of 53 to 57 on Rockwell "C" scale. May be used wherever heat, abrasion and corrosion are involved. Aircoloy No. 1 is furnished bare for oxyacetylene application and coated for electric arc welding.

AIRCOLOY® No. 6

Excellent corrosion resistance . . . high impact and good wear resistance with some degree of ductility . . . retains hardness and wear resistance at red heat . . . cold hardness of 43 to 47 Rockwell "C". May be used wherever heat, impact, abrasion and corrosion are involved.

AIRCOLITE No. 59

These cast alloy rods are recommended for application wherever abrasion resistance is particularly important. Deposits acquire a high polish in service, and maintain their high hardness at temperatures up to 800° F. Applied either electrically or by gas process. Deposits test from 54-59 on Rockwell "C" scale.

★ ★ ★

Air Reduction supplies Oxygen, Acetylene and other industrial gases . . . Calcium Carbide . . . and a complete line of gas cutting machines, gas welding apparatus and supplies, plus arc welders, electrodes and accessories. Ask us about anything pertaining to gas welding and cutting and arc welding . . . we'll be glad to help you.

AIR REDUCTION MAGNOLIA COMPANY

AIRCO

A Division of Air Reduction Company, Incorporated

Beaumont • Corpus Christi • Dallas • El Paso • Fort Worth • Hobbs
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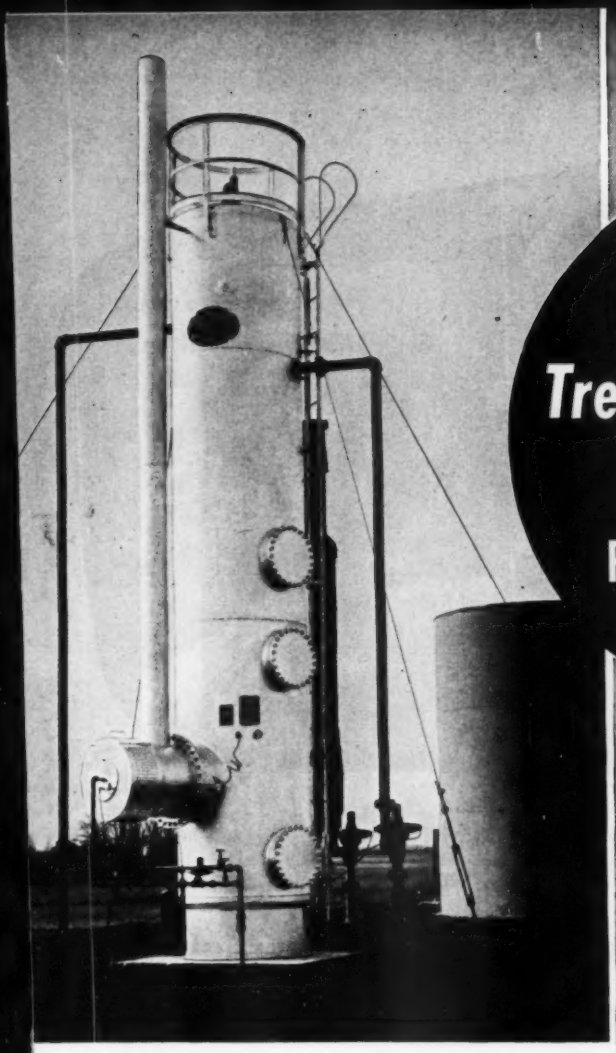
Southwestern Headquarters for Oxygen, Acetylene and Other Gases . . . Carbide . . . Gas Welding and Cutting Machines Apparatus and Supplies . . . Arc Welders, Electrodes and Accessories



SETTLE YOUR *Treating Problems* WITH PARKERSBURG

● **The most important step in settling emulsion treating problems is selecting the proper size and type of equipment. And the two most important factors controlling selection of the right treater are heating capacity required and quiet settling time allowed a given volume of oil.**

Using this proven formula, Parkersburg offers 8 different types of treaters in a total of 32 sizes. From this wide range of emulsion treaters, Parkersburg can recommend exactly the treater required to meet the production characteristics of any given well. Ask your Parkersburg Representative about the size and type to meet your treating problem.

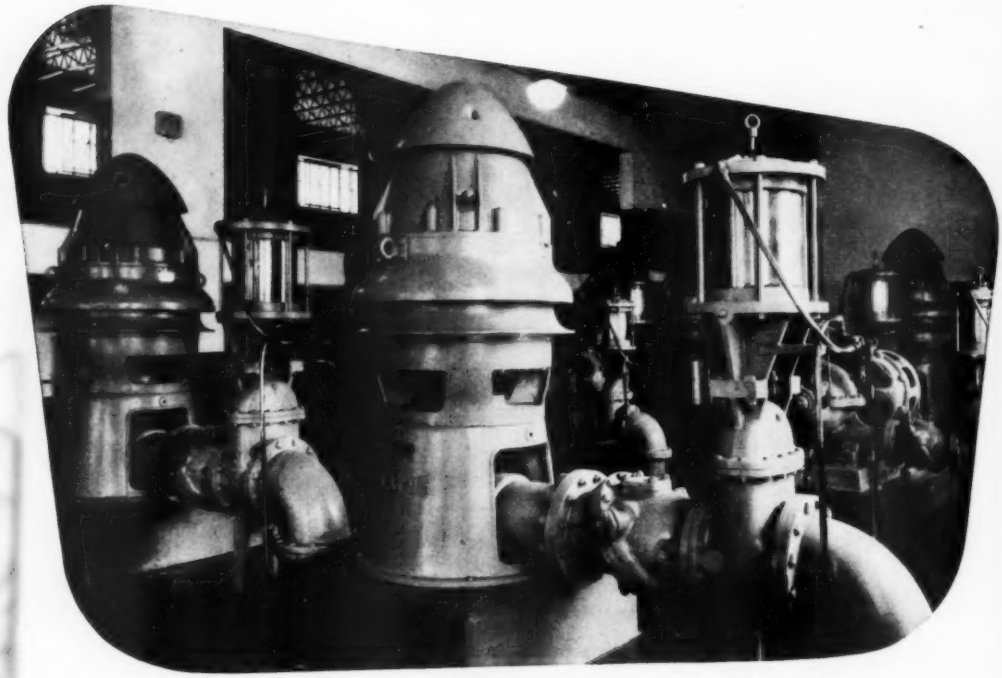
THE PARKERSBURG RIG & REEL COMPANY
Parkersburg, West Va.

No. 5119

PARKERSBURG
PRESSURE EQUIPMENT

HORIZONTAL AND VERTICAL SEPARATORS • HYRECO • HYDRACEPTER • SCRUBBERS • TREATERS • HEATERS

Manufactured in Houston, Texas



LAYNE PUMPS

Catalogs

—on Layne Short Coupled vertical turbine service pumps are illustrated with many installation pictures and diagrams of their use in line boosting, spray ponds, river intakes, cooling towers, engine cooling, etc. A copy will be sent on request. No obligation.

serving the city of decatur, alabama

Nine Layne river intake and filtered water pumps have been installed to quadruple Decatur, Alabama's city water supply. Four of these short coupled vertical turbine pumps have a combined capacity of 4-million gallons of filtered water daily.

These self priming, space saving pumps are Layne designed and precision built to maintain peak operating efficiency. They are constructed of materials selected for durability and are rugged enough to give excellent service for the years to come.

Like the city of Decatur, a great number of other municipalities, factories, processing plants and chemical works have found Layne pumps to be exactly as described. All are engineered for the job they are to do . . . and all more than fulfill their performance obligations. For further information address

LAYNE & BOWLER, INC.
General Offices, Memphis 8, Tenn.

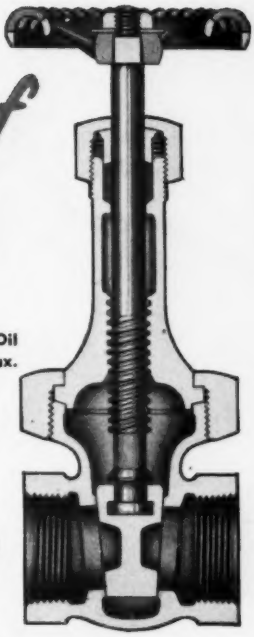
Layne water wells

VERTICAL TURBINE PUMPS-WATER TREATMENT

Now-A Complete Line of Crane L-P Gas Valves

SIZES: ¼ to 2 in. incl.

WORKING PRESSURES: UL approved for L-P Gas up to 250 Pounds, Max. Also for Oil or Gas—400 Pounds, 150 Deg. F. Max.; and Water—400 Pounds, 200 Deg. F. Max.



GATE—No. 422
Cross-Section

Now, on L-P Gas piping services, you can standardize throughout on dependable, durable Crane L-P Gas valves. By rounding out this line with a companion gate valve, Crane gives you a complete line of valves for the service.

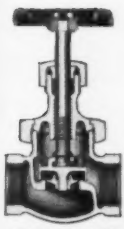
Like the Crane globe, angle, and check valves shown here, the new Crane gates are Underwriters' Approved for L-P Gas service. They are recommended for use in branch and by-pass lines, and for other installations where metal-to-metal seating is approved.

MATERIALS—CONSTRUCTION—TESTING

Body and bonnet of Crane L-P Gas gates are ruggedly constructed of high grade Crane Special Brass to withstand toughest working conditions. The disc, of solid wedge design, is Crane Nickel Alloy, hard, tough, and highly resistant to wear. A deep stuffing box with approved type packing, provides long-lasting, tight sealing of the rising stem. Union ring bonnet joint allows repeated dismantling of the valve without affecting joint tightness.

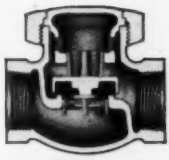
All Crane L-P Gas Valves are air tested for seat tightness.

ASK FOR CIRCULAR AD-1899—This free circular gives complete information on Crane L-P Gas Valves—gates, globes, angles, and checks. Includes service recommendations, sizes, prices and dimensions. Ask your Crane Representative for a copy, or write to address below. No obligation.



GLOBE—No. 130
Cross-Section

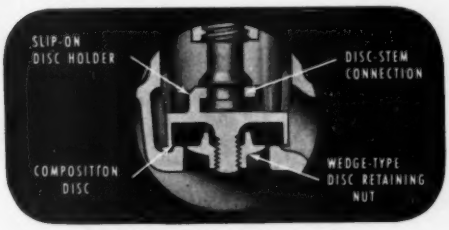
ANGLE—
No. 131



CHECK—No. 132
Cross-Section

CRANE QUICK-CHANGE DISC FEATURE

In globe, angle, and check valves which have composition disc, the disc can be quickly replaced without removing valve from line. Merely take off bonnet assembly, remove disc holder, and replace with spare disc holder containing new disc.



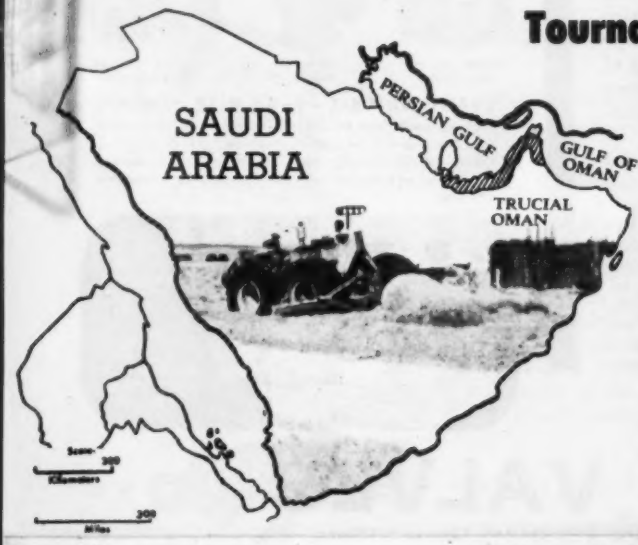
CRANE VALVES

CRANE CO., *General Offices:* 836 S. Michigan Ave., Chicago 5, Illinois
Branches and Wholesalers Serving All Industrial Areas

VALVES • FITTINGS • PIPE • PLUMBING • HEATING

250 miles from *in desert*

Working in 150° heat, Tournadozer prepares area for oil derricks. Unit also levels sites for warehouses, fuel dumps, and commissary storage.



Tournadozer proves reliability in oil field exploration

To speed exploration of potential oil fields, Iraq Petroleum Co., Ltd., of Tripoli, Lebanon, is using a highly mobile C Tournadozer to build and maintain roads, level campsites and storage areas, and prepare drill locations.

Currently on expedition to the remote coastal desert country between the Persian and Oman Gulfs in Saudi Arabia, the Tournadozer has to operate in temperatures ranging from 35° to 150° F. Its work is entirely in sand—mostly dune and desert blow sand, with occasional outcroppings of sandstone and coralstone, and some salt flat areas. Despite these severe con-

LETOURNEAU LET EQUIPMENT

R. G. LeTOURNEAU, INC.

PEORIA, ILLINOIS

Tournadozer—Trademark Reg. U.S. Pat. Off. EM104-rd

the nearest oasis

temperatures to 150°F.

Building access road from temporary personnel camp to main cross-country highway (the only permanent road along the Trucial coast), Tournadozer drifts 2½ yd. load of sand. Road will be used to transport truck loads of ½ to 25 tons.

ditions, the Tournadozer has been working steadily 10 to 18 hours daily for the past year. Only servicing required during this time has been a routine weekly inspection. Tires have stood up well under the extreme heat and in the abrasive sand that cause excessive wear on the many moving parts of track-type equipment. This trouble-free operation is of prime importance. The nearest major repair facility is more than 250 miles away.

Because of this dependability and greater operating speed, Tournadozer now handles ⅗ of the earthmoving requirements while a crawler-tractor handles only ⅕. By driving from one task to the next at speeds up to 19 m.p.h., Tournadozer has been a major factor in keeping landleveling, road building and road maintenance ahead of schedule.

Another of this machine's major advantages is its simple system of steering and its electric "push-button" blade control. Operation is so easy that inexperienced Arabian workers have very little difficulty in maintaining high standards of production with the Tournadozer.

Like Iraq Petroleum Company, scores of progressive oil companies and governmental departments are taking advantage of this advanced, easy-to-operate earthmoving machine. If you are interested in the economics of modern, rubber-tired, high-speed equipment for faster, lower-cost completion of your projects, your LeTourneau Distributor can help you. He will gladly analyze your equipment needs at any time. Call him the next time you're thinking of adding to your dozer fleet. There's no obligation.

For more TOURNADOZER information . . . write R. G. LeTOURNEAU, Inc., Peoria, Ill.

We're interested in: ☐ specifications ☐ price, delivery information ☐ production analysis on present operation

NAME ..... TITLE .....

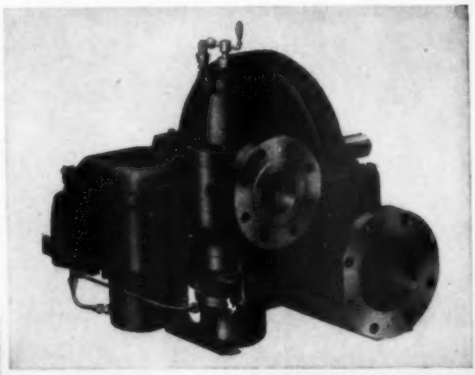
COMPANY ..... DEPT. OR DIV. .....

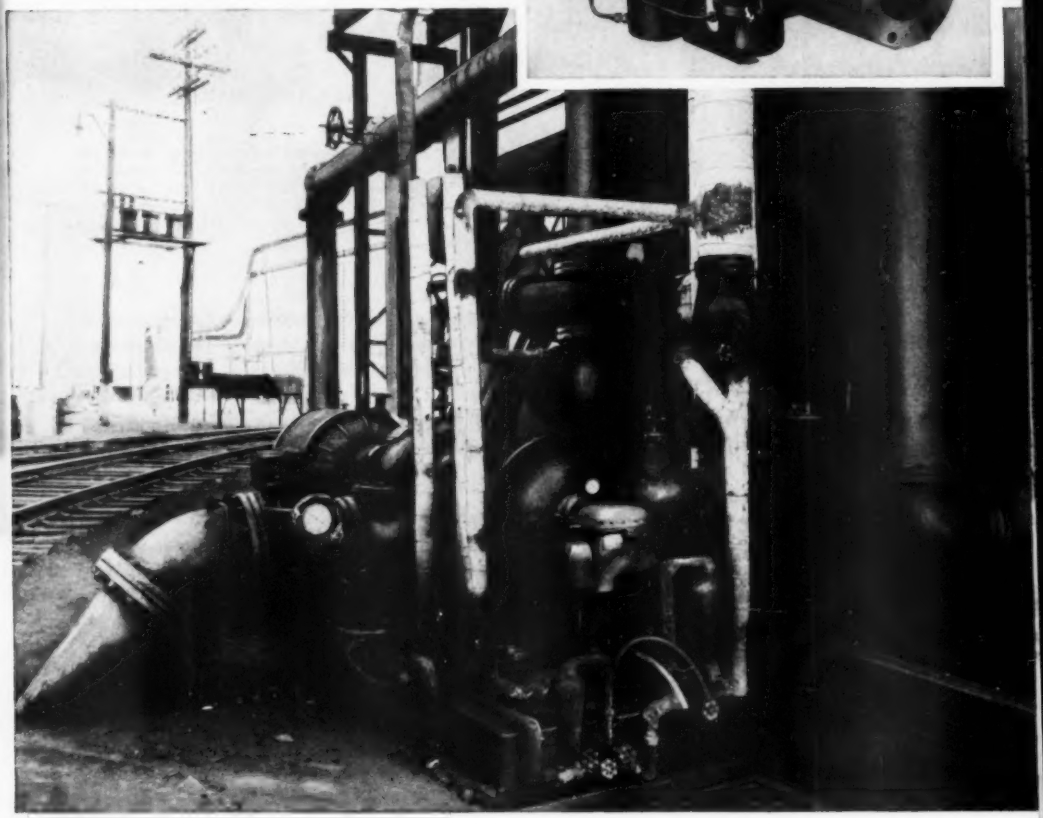
STREET ..... CITY, STATE .....

Type of work, materials to be handled EX104-ot

in turbine drives
Hydraulic Governing

TYPE DP TURBINES





OUTDOOR INSTALLATIONS, such as this one in an oil refinery, are taken in stride by the DP—another advantage of the totally enclosed, hydraulic governing system. Weather conditions and corrosive atmospheres don't bother the sealed-in unit.

DP means Dependable Power

Means Dependability

No part of a mechanical-drive turbine has more to do with day-to-day dependability than the governor. And in most installations, dependability is something that comes ahead of all other considerations—something you're willing to pay a little more to get.

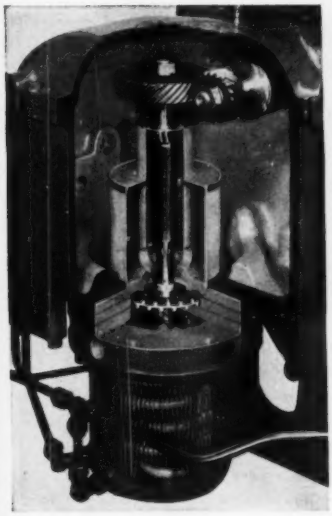
That's why General Electric standardized three years ago on hydraulic governing for its small, mechanical-drive turbines. The Type DP has the same kind of governor that's used with large, utility-type turbines. The operating record of hundreds of DP's in service throughout the country testifies to the soundness of this design.

It eliminates such elements as push rods, thrust bearings, knife-edges, etc., which are subject to wear and maladjustment. The governor operates in a totally enclosed oil atmosphere which protects parts from corrosion and rust.

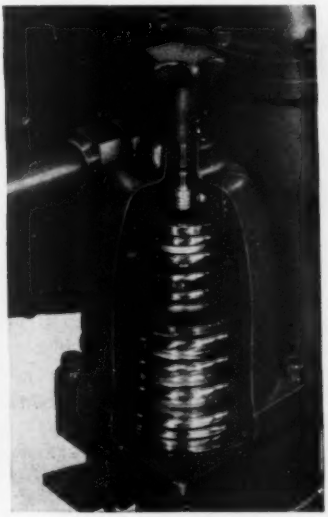
Sometimes, turbines are used as standbys and put in service only at irregular intervals. Hydraulic governing eliminates the possibility of gumming and sticking during long periods of idleness—the DP is ready to go at a moment's notice.

Performance-wise, the DP provides a 30% adjustable speed range—adequate for most applications. If you need more, the Type DR is available with a 6 to 1 speed range. Ask your nearby General Electric sales engineer for complete DP details. *General Electric Company, Schenectady, N. Y.*

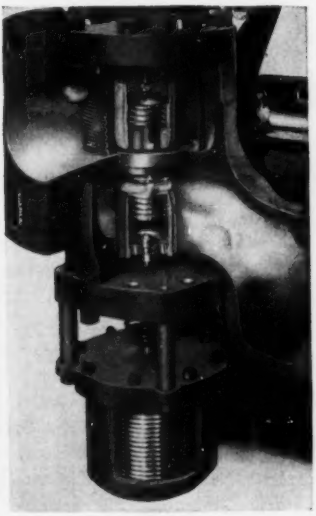
HOW THE DP GOVERNOR OPERATES



This turbine-type oil pump, gear driven from the main shaft, signals any variation in the turbine speed due to changes in load. The pump also provides oil pressure for positioning the governor valve.



Acting on the speed signal from the oil pump, this pressure relay controls the amount of oil pressure in the operating cylinder. The pressure relay operates automatically after being hand set by the operator.



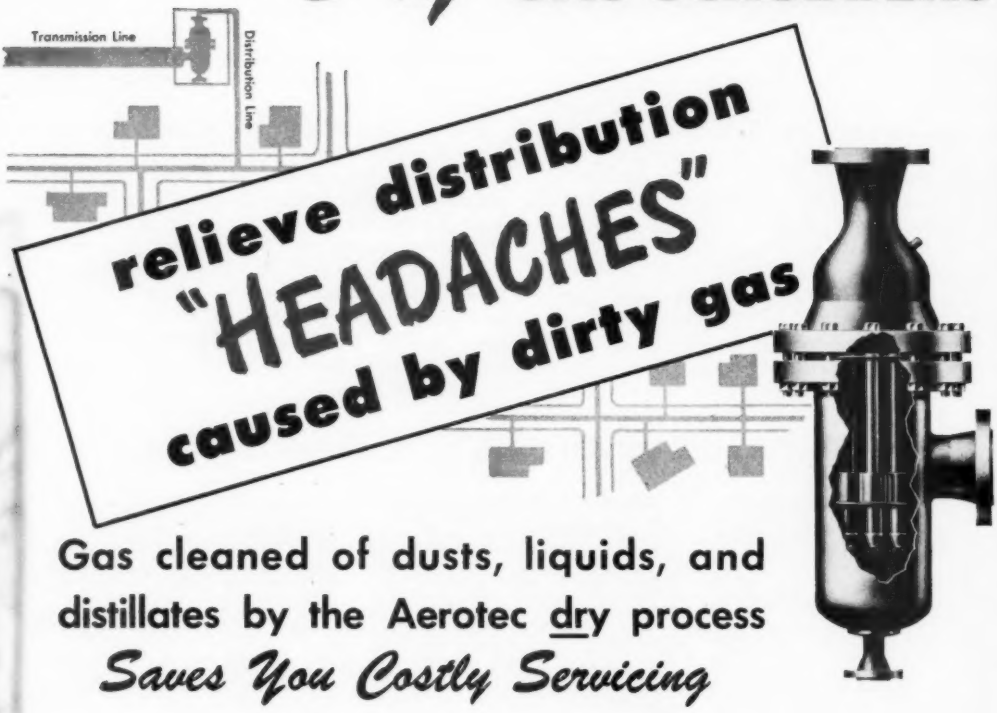
The operating cylinder, controlled by the relay, opens and closes the governing valve, thus regulating the steam admitted to the turbine. This system almost completely eliminates the need for moving parts.

GENERAL ELECTRIC

252-51

AEROTEC

Dry GAS SCRUBBERS



relieve distribution "HEADACHES" caused by dirty gas

Gas cleaned of dusts, liquids, and distillates by the Aerotec dry process

Saves You Costly Servicing

Natural gas, although cleaned often in cross-country transmission, still needs cleaning in your local distribution lines. Aerotec Dry Gas Scrubbers are the ideal means of supplying clean gas to customers' appliances, drastically reducing costly service calls.

Highly efficient Aerotec Scrubbers separate dusts, liquids, and distillates from the gas stream by centrifugal force. The method is *completely dry*, eliminating the carryover of oil or other filtering mediums as in conventional scrubbers. Absolutely uniform, small diameter tubes in the Aerotec units precipitate the foreign matter for continuous discharge. The operating principle involved prevents overloading.

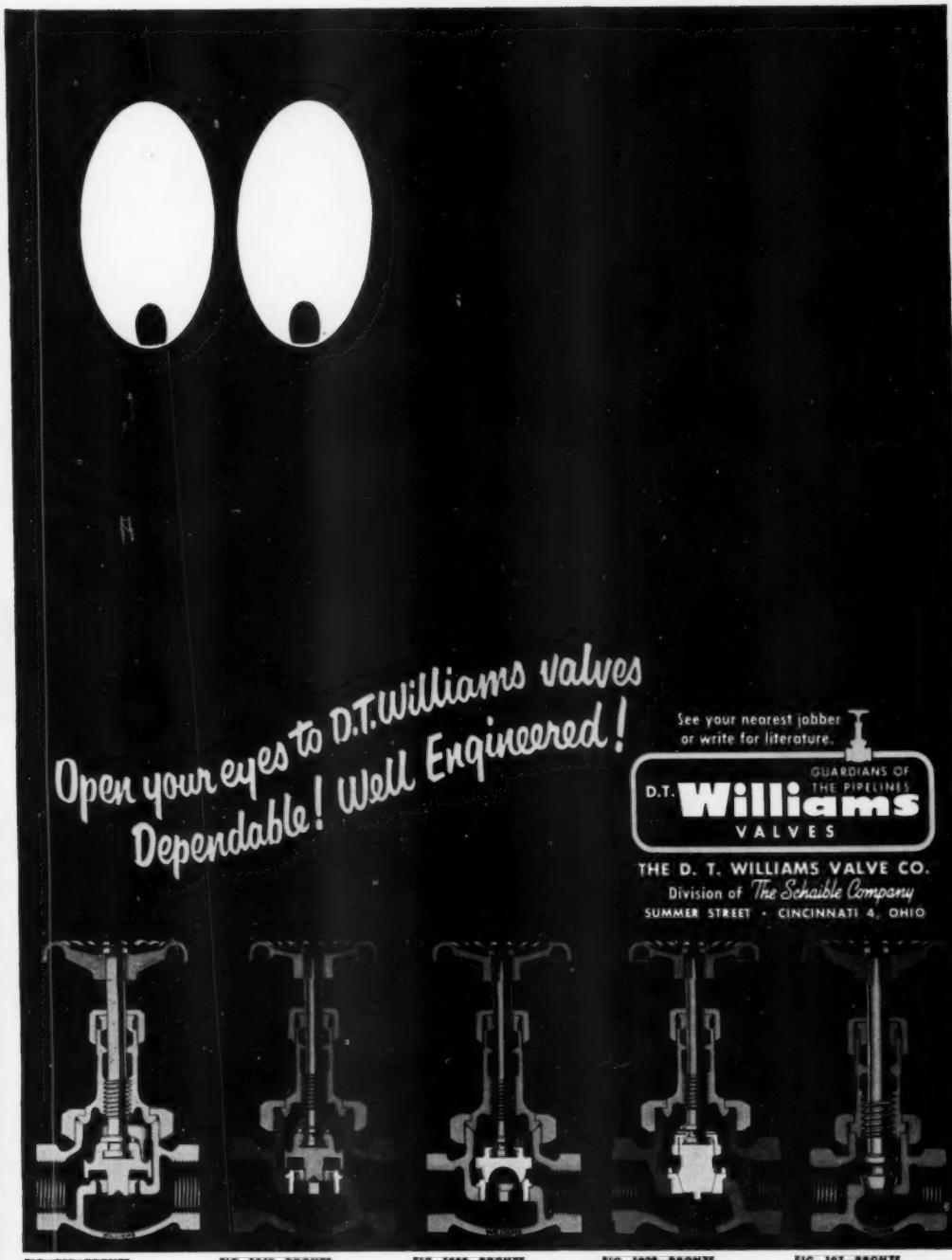
Your nearby Thermix Project Engineer, with the backing of wide experience in the industry, welcomes the opportunity to assist you in solving your gas cleaning problems. A study of the advantages that Aerotec Dry Gas Scrubbers offer you is available in our descriptive Bulletin 501. Why not call or write for your copy today?

Project Engineers **THE THERMIX CORPORATION** Greenwich, Conn.
(Offices in 38 Principal Cities)

Canadian Affiliates T. C. CHOWN, LTD., Montreal 25, Quebec; Toronto 3, Ontario

Manufacturers

THE AEROTEC CORPORATION
GREENWICH, CONN.



Open your eyes to D.T. Williams valves
Dependable! Well Engineered!

See your nearest jobber
or write for literature.

GUARDIANS OF THE PIPELINES
D.T. Williams VALVES

THE D. T. WILLIAMS VALVE CO.
Division of The Schaible Company
SUMMER STREET · CINCINNATI 4, OHIO

FIG. 912—BRONZE
"VULCODISC" GLOBE VALVE
Renewable Composition Disc • Integral Seat • Union Bonnet • Screw and Flanged Ends • 200 lbs. W.S.P., 400 lbs. W.O.G., ⅛" to 3"

FIG. 1040—BRONZE
"ELITE" GLOBE VALVE*
Renewable Composition Disc • Copper Nickel Alloy Seat • Union Bonnet • Screw and Flanged Ends • 225 lbs. W.S.P., 400 lbs. W.O.G., ⅛" to 3"

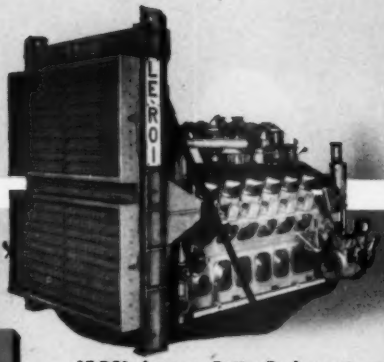
FIG. 1000—BRONZE
"ELITE" GLOBE VALVE*
Copper Nickel Alloy Renewable Full Way Disc and Regrindable Seat • Union Bonnet • Screw and Flanged Ends • 225 lbs. W.S.P., 400 lbs. W.O.G., ⅛" to 3"

FIG. 1028—BRONZE
"ELITE" GLOBE VALVE*
500 Brinell Hardness Renewable Stainless Steel Plug Disc and Stainless Steel Seat • Union Bonnet • Screw and Flanged Ends • 225 lbs. W.S.P., 400 lbs. W.O.G., ¼" to 3"

FIG. 107—BRONZE
REGRINDING GLOBE VALVE*
Renewable Bronze Disc • Integral Seat • Union Bonnet • Screw and Flanged Ends • 225 lbs. W.S.P., 400 lbs. W.O.G., ⅛" to 3"

*Available at 300 lbs. W.S.P. (Angle and check types are also available at both 200 lbs. and 300 lbs. W.S.P.)

Le Roi 3 way Partnership

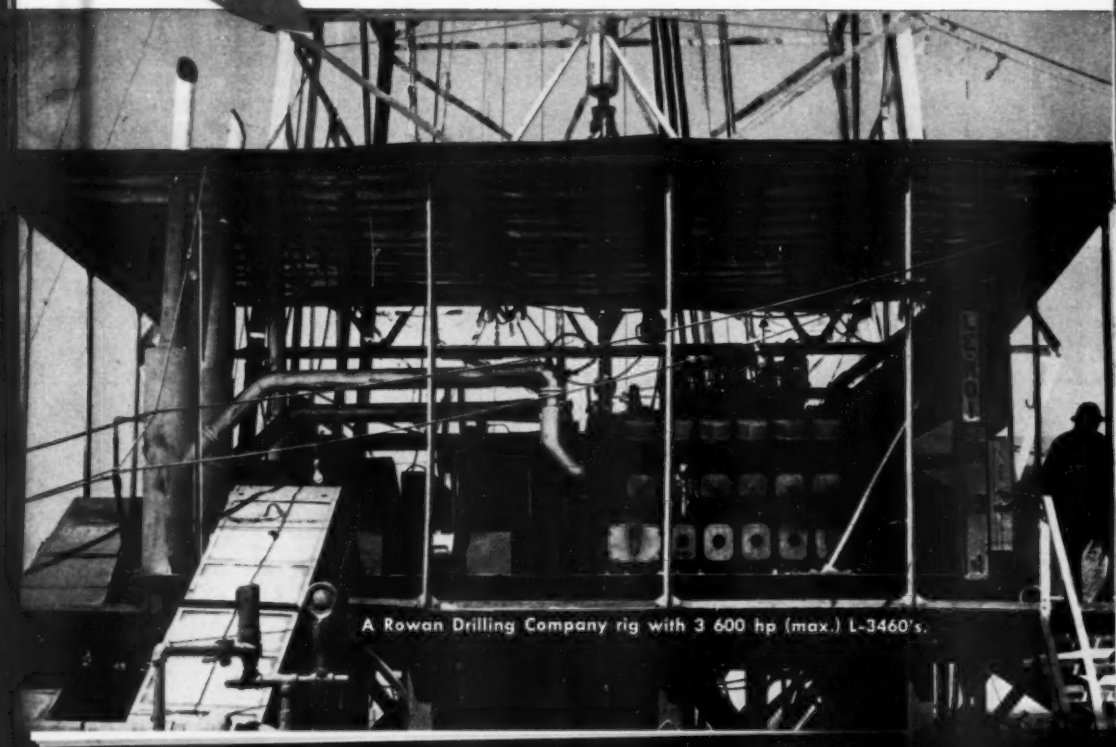


1.

LE ROI gives you Better Engines—for example the L-3460 with its advanced design, V-12 construction and 600 maximum HP — built to meet oil-field demands for more power. Compactness and a weight of only 12,200 pounds give you an extremely low weight-to-horsepower ratio.

600 hp. L3460's put

(MAX.)



A Rowan Drilling Company rig with 3 600 hp (max.) L-3460's.

2. **EXCLUSIVE LE ROI DISTRIBUTORS give you Better Applications**—distributors who sell Le Roi engines are oil-field power specialists. They know engines. That's why they can select the right power unit for any application. That's why you can count on Le Roi for dependable, low-cost power.

3. **YOU get Better Service**—yes, you get personal attention from engine experts when you deal with exclusive Le Roi distributors — because they handle Le Roi, and only Le Roi! Large parts-stocks and skilled mechanics mean prompt service and a minimum of down-time. Remember, keeping your Le Roi engines running is the sole responsibility of our distributors.

you way ahead of the field

...with compactness, more power, greater speed range, greater accessibility

Here's the last word in oil-field engine design — Le Roi's V-12 L3460 with its wide speed range from 600 to 1350 rpm and horsepowers from 350 to 600. It produces plenty of low-cost dependable power for a wide variety of applications — drilling, pipeline service, power generation, etc.

Rowan Drilling Company, for example, uses 10 of these engines on four different rigs. The advantages, of course, for drill-rig applications are: fast acceleration, plenty of lugging power at low speeds, and compactness.

The L3460 is also a standout for pipeline service. It has unusual dependability and economy under continuous load, space-saving size for easy installation, and easy accessibility that simplifies maintenance.

It pays to use L3460's. Not only do you get oil-field power at its best but you also enjoy the benefits of Le Roi's 3-way partnership. See your Le Roi distributor and find out why better engines, sound applications, and prompt personal service put you ahead of the field.

LE ROI COMPANY

MILWAUKEE 14, WISCONSIN

Plants: Milwaukee • Cleveland • Greenwich, Ohio — Oil Field Headquarters: Tulsa, Oklahoma

LE ROI

See these Le Roi Distributors for a Profitable 3-way Partnership

Oklahoma
Le Roi Company Branch—Tulsa
Carson Machine & Supply Co.—Oklahoma City

East & South Texas, Gulf Coast
Southern Engine and Pump Company — Houston, Kilgore, Edinburg, Dallas, San Antonio, Corpus Christi, Texas, and Lafayette, Houma, Louisiana.

North & West Texas, New Mexico
General Machine & Supply Co. — Odessa, Snyder, Texas.
Nortex Engine & Equipment Co.—Wichita Falls, Texas.

Kansas
Carson Machine and Supply Co.—Great Bend

Illinois — Western Kentucky
Western Machinery & Engine Company—Centralia, Illinois and St. Louis, Missouri.

Typical Le Roi Service Facility

Here's Le Roi's exclusive distributor in Oklahoma—Carson Machine and Supply Company. Centrally located and staffed with plenty of experienced manpower, Carson can give skilled service to any customer in the state within a few hours. Shop facilities are modern and include a dynamometer for testing engines. Complete parts stocks are maintained for all Le Roi engines.

Michigan
Hafer Engine Service — Reed City

Rocky Mountain Area
Gehring Equipment Co. — Casper, Wyoming, Rangeley, Col.

Northern Louisiana & Mississippi
Ingersoll Corporation — Shreveport, Louisiana, and Jackson, Mississippi.

West Coast
Le Roi-Rix Machinery Co. — Los Angeles, Long Beach and Bakersfield, Calif.

Appalachian Area
P. C. McKenzie Co., Pittsburgh, Bradford.

Canada
Lucey Export Ltd. — Calgary, Edmonton, Alberta.

DRILLING-TAMPING . . . Positive safe control of a Trackson MD8 holds a tamper steady for a Bechtel Corporation spread.

BENDING . . . An MD6 provides the power needed to bend pipe on a Lone Star Gas Co. line.

TRACKSON PIPE LAYERS.....

MAKE MONEY ON MORE THAN LAYING PIPE!

DOPING-WRAPPING . . . Heavy pipe and doping machines are handled safely by a Trackson MDW8 on an Associated Pipe Line Contractors' job.

The money-making ability of husky Trackson **PIPE LAYERS** isn't tied down to lifting, carrying and lowering pipe. These matched tools of "Caterpillar" Diesel Tractors can do a wide variety of other jobs — at a profit!

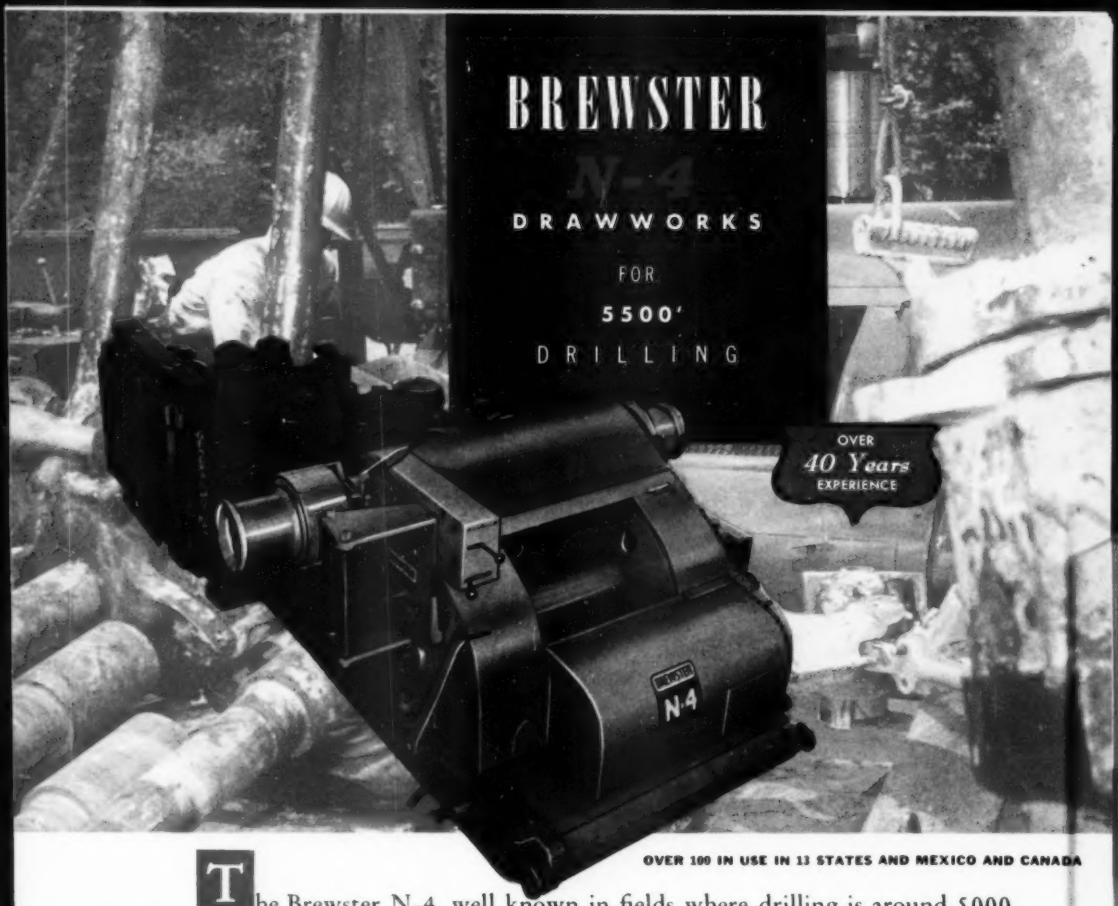
Trackson **PIPE LAYERS** with traction to go anywhere . . . speed to do a job quickly . . . lifting capacity to handle big loads . . . ability to handle and place poles and piles . . . power to set heavy machinery, bend pipe, unload supplies . . . do many heavy lifting chores with an economy that spells profit for you.

Ask your "Caterpillar" Dealer for information on the **PIPE LAYER** that can handle pipe laying as well as other heavy lifts on your spreads — or write . . .

TRACKSON COMPANY, MILWAUKEE 1, WISCONSIN
A Subsidiary of Caterpillar Tractor Co.

TRACKSON

PIPE LAYERS
TRAXCAVATORS®
TRACLOADERS
ANGLEFILLERS



OVER 100 IN USE IN 13 STATES AND MEXICO AND CANADA

The Brewster N-4, well known in fields where drilling is around 5000 feet, has earned its reputation for handling tough jobs with ease. Since its introduction in 1947, the N-4 has drilled millions of feet of hole, at a saving in time for drillers and a saving in money for drilling contractors.

FLEXIBLE POWER — Made with single diesel or twinned gasoline engines... 300 available horsepower for drilling to 5500' with 4½" drill pipe. May also be equipped with 200 horsepower engine for 4500' drilling.

TORQUE CONVERTER DRIVE — Fluid, cushioned power affords smooth flow of power... handles sudden loads easily without overloading engine. Truck type transmission available on 200 h.p. models.

SPLIT RIG DESIGN — Compact, easy to transport, quick to rig up, quick to tear down... designed for use with separately powered pump.

HIGH AND LOW SPEED DRUM CLUTCHES — Air operated friction type... controlled by a single valve which enables driller to change speeds without stopping drawworks.

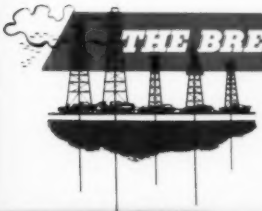
ROTARY CLUTCH — Air operated, friction type... gives the driller smooth positive control of rotary.

CLUTCHED CATHEAD SHAFT — Prevents turning of cathead when not in use.

POSITIVE CLUTCH ON LOW SPEED DRIVE — An added precaution in the event of air clutch failure or other emergency.

OPTIONAL WIRE LINE REEL — Has reel capacity of 8500 feet of 9/16" line.

OPTIONAL HYDROMATIC BRAKE — A 15" hydromatic brake may be installed as additional equipment. Reduces wear of drum brake, provides smooth, gradual braking power.



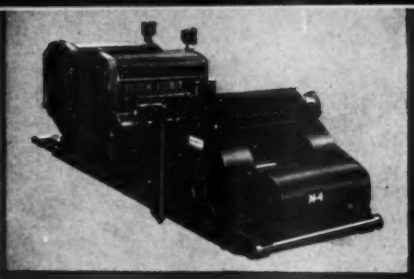
THE BREWSTER COMPANY, INC.

SHREVEPORT, LOUISIANA

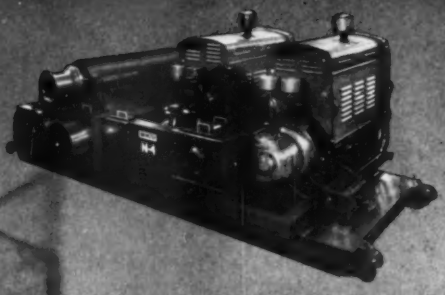
BREWSTER DRILLING EQUIPMENT

ASK YOUR NEAREST SUPPLY HOUSE TO TELL YOU ABOUT THE EXTRA BRAWN IN BREWSTER'S N-4.

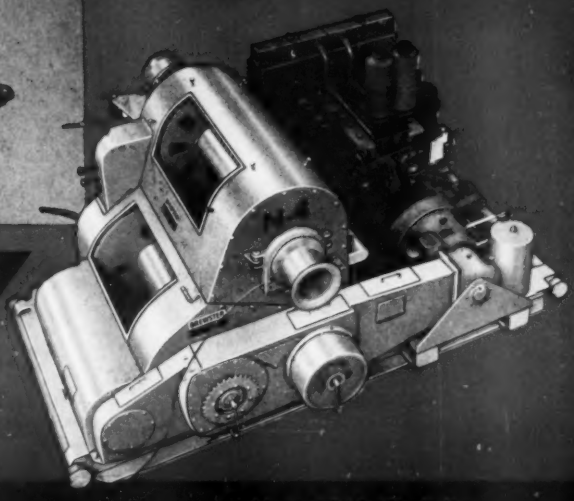
Apex Equipment Company • Murray Brooks, Inc. • Reams Supply Company
Bovaird Supply Company • Industrial Supply Company • In Canada:
Rocky Mountain Supply Company — Direct and through recognized export dealers.



The N-4 may be equipped with a single diesel or twinned gasoline engines.



The engines of two-engine models are compounded to produce 100 horsepower. Torque converters provide cushioned flow of power.



Models are available with wire line reel for swabbing, coring, etc.

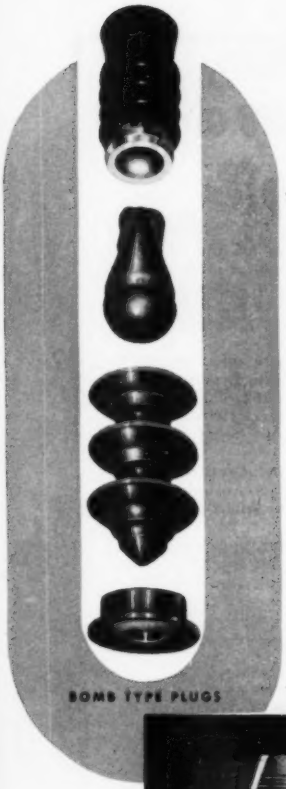
AUXILIARY EQUIPMENT *RS-18 OILBATH ROTARY, H-100 HOOK BLOCK, 4-S OILBATH SWIVEL*

THE **BREWSTER** COMPANY, INC. · SHREVEPORT, LOUISIANA

SPECIFICATIONS

DIMENSIONS	SINGLE DRUM	DOUBLE DRUM
Overall width	9' 9½"	9' 9½"
Overall length	14' 10"	14' 10"
Skid size	16 x 8 W.F.	16 x 8 W.F.
Overall height (with engine)	5' ½"	6' 9½"
Weight (without engine) with Hydromatic Brake	14,775 pounds	17,000 pounds
Weight (without engine) less Hydromatic Brake	13,775 pounds	16,000 pounds

Proved differential principle of HALLIBURTON'S DV MULTIPLE STAGE CEMENTER offers you great advantages:



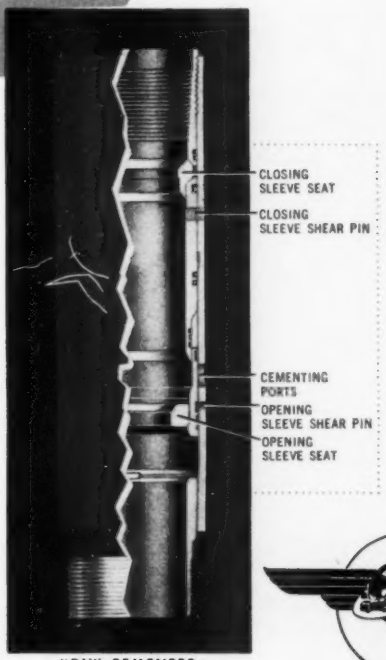
Recognized as the universal multiple stage cementing tool, Halliburton's DV Cementer has proved its value and efficiency on numerous jobs. A novel Differential Valve principle is largely responsible for its success.

The DV cementer is a precision built tool, designed and constructed to assure:

POSITIVE FLUID SHUT-OFF—by means of dual sleeves and high pressure packing. Opening sleeve seals tool ports during circulation and passage of cement for lower stage, closing sleeve seals off tool ports after completion of upper stage. Cementing ports are opened and closed after each stage by carefully designed plugs.

SAFETY AND STRENGTH—for application in any well regardless of depth, pressure, or temperature. Has strength to withstand pressures beyond the collapsible strength of casing with which it is used.

Operators everywhere use this versatile DV multiple stage tool for full depth cementing, cementing off formations at any point, reducing channeling, reducing pump pressures, dual well completion, preventing loss of cementing slurry to thieving formations, *any* job where multiple stage cementing is required. A special arrangement of opening and closing plugs and tool sleeves permit three stage cementing when desired.



"DV" CEMENTER

Phone your nearby Halliburton representative for your next multiple stage job and get the advantages offered by the DV Cementer. Halliburton Oil Well Cementing Company, Duncan, Oklahoma.

HALLIBURTON

YEARS AHEAD IN CEMENTING SERVICE!

It begins where other gauges leave off-

The now recognized ability of the Marsh Mastergauge to do a better job for more years is a direct result of setting out to design and build an instrument possessing accuracy, precision, and stamina beyond any gauge that had ever been produced.

Try the Mastergauge where other gauges have failed — under the gruelling conditions of extreme temperature, heavy pulsation, racking vibration — conditions that wreck the ordinary kind. You will find that it truly begins where others leave off.

We can say this today without fear of contradiction because Mastergauge has *said it for itself* . . . in thousands of applications throughout the oil country.

And remember: The toughest gauge to knock *out* of adjustment is the easiest gauge to get back *in* adjustment . . . thanks to the exclusive "Marsh Recalibrator."

Ask your supply store, or write us, for Marsh Oil Industry Bulletin.

MARSH INSTRUMENT COMPANY
Sales affiliate of Jos. P. Marsh Corporation

Dept. L, Skokie, Ill.

The Marsh branch plant at Houston offers shipment from stock and advanced facilities for repairing all makes of gauges.

MARSH MASTERGAUGE —

Marsh Mastergauge, guaranteed accurate within ½ of 1% of reading—a precision gauge for a precision industry. The Mastergauge line also includes gauges especially designed for blenders, boilers, burners, capping, Christmas trees, columns, heaters, hydrogen units, instrument panels, pumps, Reid vapor bombs, scrubbers, separators, mud pumps, stills, towers and other applications. A typical installation is this even dozen of Mastergauges in distillate fields, Cranfield, Miss.

MARSH STOCKED by Your Local Supply Store **GAUGES**

BJ engineering puts power to work for you...

TYPE B POWER SLIPS smooth pipe handling on round trips

BJ TYPE B POWER SLIPS are another important BJ power development made to cut your drilling costs. Here's why –

FAST! Slips are pressure raised *and pressure set* at the touch of a foot pedal...pipe is pressure centered...slip ring floats free when making up or breaking out with the table...BJ Power Slips swing in or out of operating position in a matter of seconds.

COMPACT! A single husky pressure cylinder raises and lowers slips instantly . . . offset arm construction increases work room . . . unitized slips are quickly changed for different drill pipe and casing sizes.

SAFE! When BJ slips are set, arm ring clears top of rotary table by several inches – an important safety point. Rugged BJ construction insures ample strength for the heaviest pipe strings.

VERSATILE! The Type B handles 2⅜" to 7" drill pipe or casing by simply changing slips. *It can be unitized with any rotary . . . is installed without substructure changes.*

See your nearby BJ Representative who has all the facts on Type B Power Slips. Write for Bulletin 450 describing Type B Slips in full detail.

Byron Jackson Co.

MEANS ENGINEERED OIL TOOLS

Buy the Trouble-Free OIL FIELD ENGINE

MINNEAPOLIS-MOLINE
MM
MODERN MACHINERY

5 big advantages for continuous duty and long life

- EXTRA HEAVY CONSTRUCTION
- STANDARDIZED QUALITY CONTROLLED PARTS
- SLUDGE-FREE OPERATION
- UNIFORM OPERATING TEMPERATURE
- PIONEER OIL FIELD APPLICATION EXPERIENCE

Length of engine life is determined by the stamina built into the parts. By comparing the weight and size of parts you can calculate how long they will last and give trouble-free continuous service.

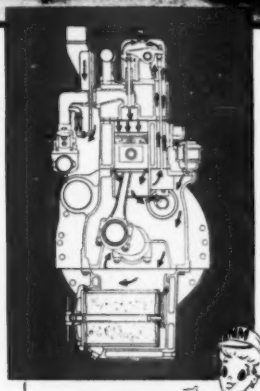
MM heavy-duty oil field engines have large diameter crankshafts, generous bearing surfaces, and heavy flywheel housing flanges that prevent deflection. Cylinder heads, removable cylinder blocks and crankcases are of thick wall design that eliminates distortion.

It is this extra margin of size and strength built into MM parts that makes them *stay put*, and makes MM engines stay on the job *longer!*

To back up this heavy-duty design under severe operating conditions, MM oil field engines have exclusive hot water jacketed base pans and metered vacuum crankcase ventilation. These features are proved by 10 years of continuous operation without major overhaul.

Get the facts about how these features prevent sludging and maintain uniform top to bottom temperature control under extremely unfavorable fuel and climatic conditions. Other MM cost-reducing features you will appreciate are the many standard parts, interchangeable on all power sizes that make possible finest precision and require minimum spare part stocks.

Quality Control IN MM FACTORIES ASSURES DEPENDABLE PERFORMANCE ON THE JOB



Minnie Moline's reminder: "*MM exclusive base pan and crankcase ventilation assure trouble-free operation.*"

MINNEAPOLIS-MOLINE MINNEAPOLIS 1, MINNESOTA

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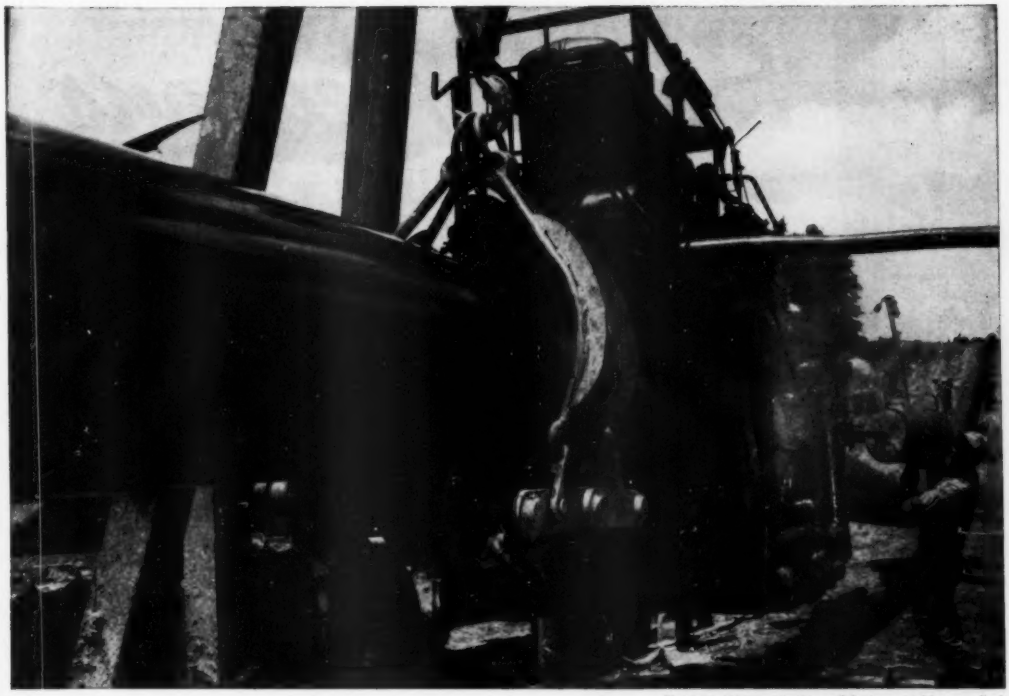

Koppers Bitumastic Enamel being machine-applied

Most effective barrier against corrosion —BITUMASTIC® ENAMEL

KEEP moisture away from pipe-line surfaces with a protective coating and you prevent corrosion. It's as simple as that, in theory. In actuality, though, there's more to the story . . . *ordinary* coatings just can't keep out moisture, year after year.

But Bitumastic Enamels can!

These durable enamels are processed from a base of coal-tar pitch, *making them actually impervious to moisture.* They make a tight bond with the pipe. They do not disintegrate with age. They are chemically resistant to soil elements, and maintain continuously high electrical resistance.

And these qualities pay off. Many of this country's pioneer oil and gas pipe lines—laid in the 1920's—are still giving good service today, thanks to the effective protection provided by Bitumastic Enamels.

Protect your pipe lines, the sure way, by specifying "Bitumastic Enamels." Your Koppers representative will give you complete details and estimates.

Bitumastic Enamels soon available from Koppers new California Plant!

As soon as present construction work is completed, Koppers will be able to supply Bitumastic Enamels from a new plant at Fontana, California. The plant is being built to give you better service in the West.

KOPPERS BITUMASTIC ENAMELS
REG. U.S. PAT. OFF.

KOPPERS COMPANY, INC., Tar Products Division, Dept. 303-T, Pittsburgh 19, Pa.

DISTRICT OFFICES: BOSTON, CHICAGO, LOS ANGELES, NEW YORK, AND WOODWARD, ALABAMA

Sound Reasons

for drilling with

J&L WIRE ROPE

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You don't need a crew of excess hands to string up your crown and traveling blocks with J&L Wire Rope. For a thing made of tough steel, it is remarkably easy to handle.

It runs snugly over the sheaves, spools evenly under any load, and returns the idle block with the speed a good crew demands.

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You'll enjoy using J&L Wire Rope. Like your other equipment that's tops, it gives you pride and confidence.

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General Offices: TULSA, OKLAHOMA

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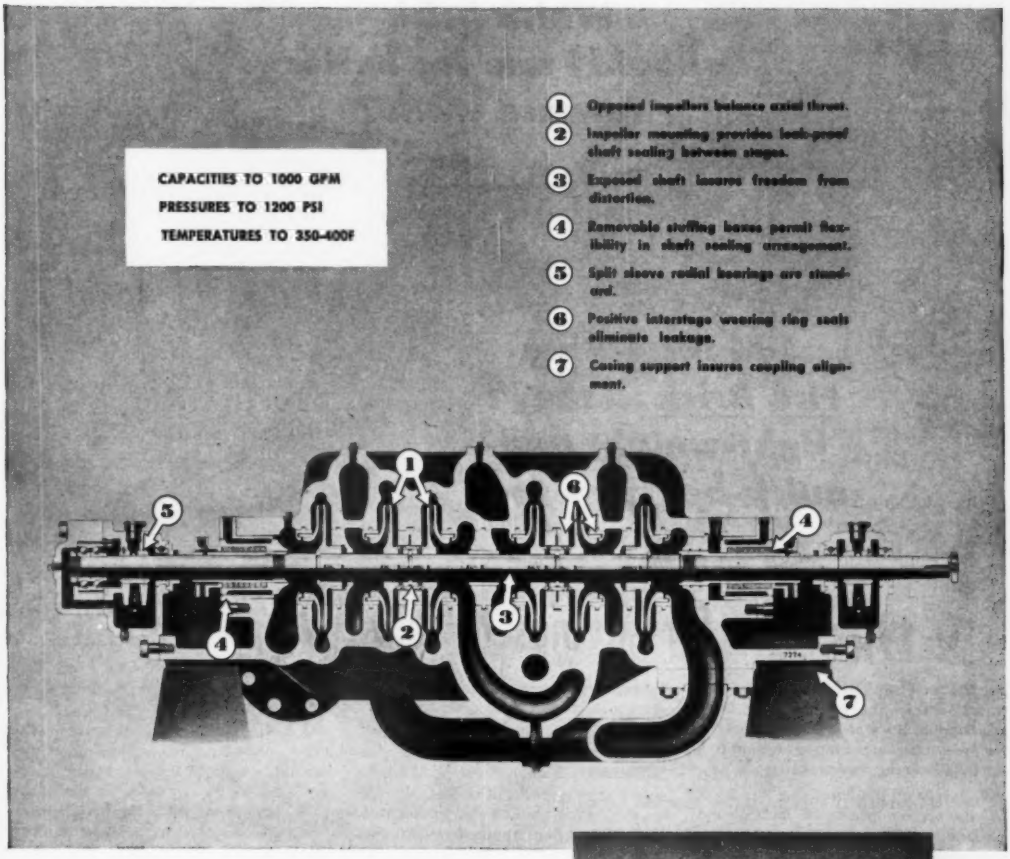
Subsidiary of Jones & Laughlin Steel Corporation

Simplicity, long life, easy maintenance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PRESSURES TO 1200 PSI
TEMPERATURES TO 350-400F
1 Opposed impellers balance axial thrust.
2 Impeller mounting provides leak-proof shaft sealing between stages.
3 Exposed shaft insures freedom from distortion.
4 Removable stuffing boxes permit flexibility in shaft sealing arrangement.
5 Split sleeve radial bearings are standard.
6 Positive interstage wearing ring seals eliminate leakage.
7 Casing support insures coupling alignment.

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DE LAVAL
OPPELLER PUMPS

Look at the seven outstanding features shown in the cross-section and you'll see why De Laval Refinery Pumps stay on the line for years...trim maintenance costs. Use these pumps for service up to approximately 1,000 gpm and 1,200 psi with temperature up to 350-400F. They can handle liquids ranging from propane to strong caustic. Write today for bulletin giving full application and specification data.

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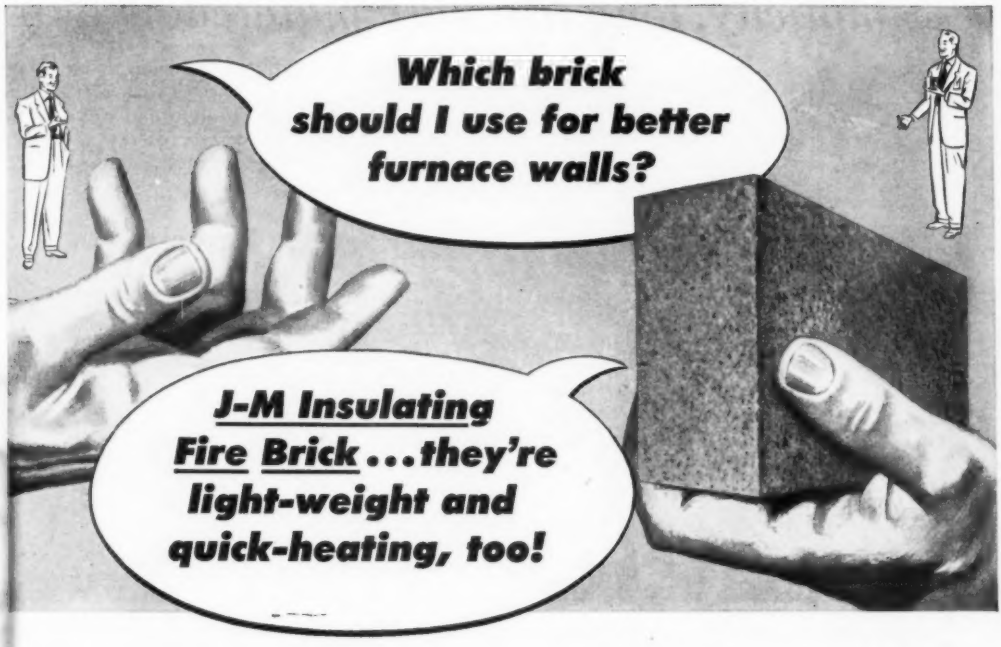
Trenton 2, New Jersey

DL 144



6 types . . . for savings in services up to 3000F

Because of their quick-heating and low-heat transfer characteristics, Johns-Manville Insulating Fire Brick are efficient fuel-savers for use at operating temperatures up to a full 3000F on the insulation.

Each type of J-M Insulating Fire Brick has the correct balance of thermal and physical properties that assures maximum economies within a specific temperature range. All types are *quick-heating* . . . operating temperatures are reached in a short time, thereby saving fuel.

Identical materials can also be obtained in large size units known as Johns-Manville Insulating Fireblok. Fireblok have the same properties as the brick, but are made in extra large sizes for added construction economies. The large units can be installed faster . . . require fewer joints and less bonding mortar. During rebuilding or repair, furnace down-time is appreciably shortened with Fireblok construction.

A Johns-Manville insulation expert will gladly explain the advantages and economies of using J-M Insulating Fire Brick and Fireblok for refractory linings or as back-up insulation behind other refractory protection. Write to Johns-Manville, Box 60, New York 16, N. Y. In Canada, write 199 Bay St., Toronto 1, Ontario.

Properties	Types of Insulating Fire Brick and Fireblok					
	JM-3000	JM-28	JM-26	JM-23	JM-20	JM-1620
Temperature limit	†3000F	†2800F	†2600F	†2300F	†2000F	‡2000F †1600F
Density, lb per cu ft	63–67	58	48	42	35	29
Transverse strength, psi	200	120	125	120	80	60
Cold crushing strength, psi	40	150	190	170	115	70
Linear shrinkage, percent	*0.8 at 3000F	4.0 at 2800F	1.0 at 2600F	0.3 at 2300F	0.0 at 2000F	0.0 at 2000F
Reversible thermal expansion, percent	0.5–0.6 at 2000F	0.5–0.6 at 2000F	0.5–0.6 at 2000F	0.5–0.6 at 2000F	0.5–0.6 at 2000F	0.5–0.6 at 2000F
Conductivity (Btu in. per sq ft per F per hr at following mean temperatures)						
500F	3.10	2.00	1.92	1.51	0.97	0.77
1000F	3.20	2.50	2.22	1.91	1.22	1.02
1500F	3.35	3.00	2.52	2.31	1.47	1.27
2000F	3.60	3.50	2.82	2.70	1.72	....

*24-hr Simulative Service Panel Test; all others 24-hr soaking period. †Back-up or exposed. ‡Back-up only.

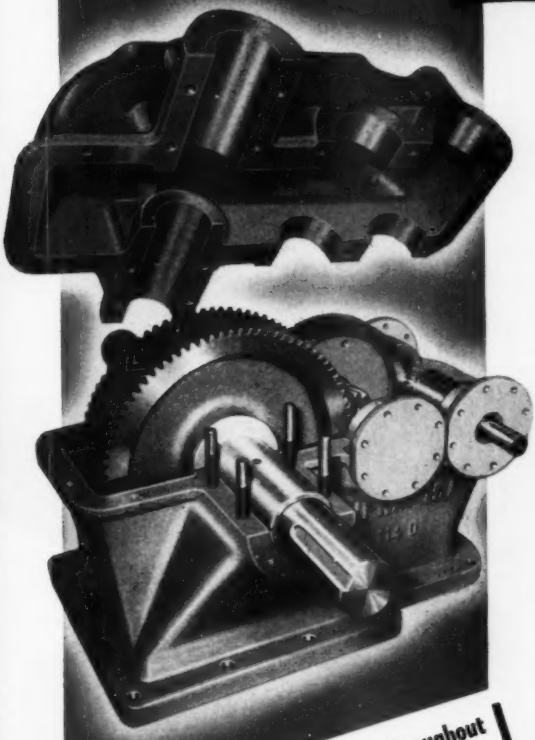
JOHNS MANVILLE JM PRODUCTS

Johns-Manville *first in* **INSULATIONS**

No "SHIP-IN-... TTLE" construction

on a *Lufkin*

TWO-PIECE GEAR HOUSING



Provides easy accessibility for assembly and inspection

- Allows main gear to be assembled on shaft with heavy 60 ton pressed fit. All rotating parts easily set in place before cover is bolted on. No "threading" of shafts and bearings as necessitated by solid gear box with no split.
- Made of High Tensile Lufkaloy-Iron heavily ribbed inside, giving smooth exterior, pleasing in appearance and easy to keep clean.
- Large Heat Treated Alloy Steel Studs capable of carrying ten times rated load without stretching.
- Large Clean Out Hole for removing sludge from bottom of box.

Plenty of "BEEF" throughout which is typical LUFKIN DESIGN POLICY

LUFKIN FOUNDRY & MACHINE COMPANY

LUFKIN, TEXAS

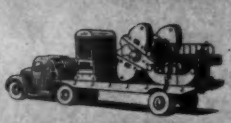
Branch sales and service Houston, Dallas, New York, Tulsa, Los Angeles, Seminole, Oklahoma City, Corpus Christi, Odessa, Kilgore, Wichita Falls, Casper, Wyoming, Great Bend, Kansas.

Lufkin Equipment in CANADA is handled by

THE LUFKIN MACHINE CO., LTD., 14321 108th Avenue, Edmonton, Alberta, Canada.

LUFKIN PUMPING UNITS

LUFKIN-CUMMINS-DETROIT ENGINES



LUFKIN OIL FIELD AND INDUSTRIAL TRUCK TRAILERS

INDUSTRIAL SPEED REDUCERS AND INCREASERS

DIVISION LUFKIN FOUNDRY & MACHINE COMPANY INDUSTRIAL MILL AND AUTOMOTIVE SUPPLIES

here's half a dozen ways to

Save Time, Labor, and Money

on your drilling rigs

FORGED STEEL AND MALLEABLE COUPLINGS — for slush pump manifolds, mud lines, steam lines, fuel, and water lines.

BIG INCH COUPLING WITH BLANKING PLUG — the original slush pump suction union and blanking plug for compounding pumps.

SLUSH PUMP SUCTION STRAINER — keeps trash out . . . life in . . . pump valves and seats.

FLEXI-BALL JOINT — keeps mud lines and rotary hose out of a bind and facilitates making up misaligned connections.

POSITIVE CHOKE BODY — for safe, dependable mud choke manifold service.

THORNHILL-CRAVER COMPANY

P. O. BOX 1184 HOUSTON, TEXAS

keep ***UNIBOLT*** *in mind when you're rigging up!*

MALONEY - CRAWFORD

Scores Again

HORIZONTAL TREATER

In case of a total loss of reservoir gas pressure, a new Maloney-Crawford Horizontal Treater development provides for use of the bottom hole pump in keeping the treater operating. A 15-minute easy-to-make changeover is all that is required.

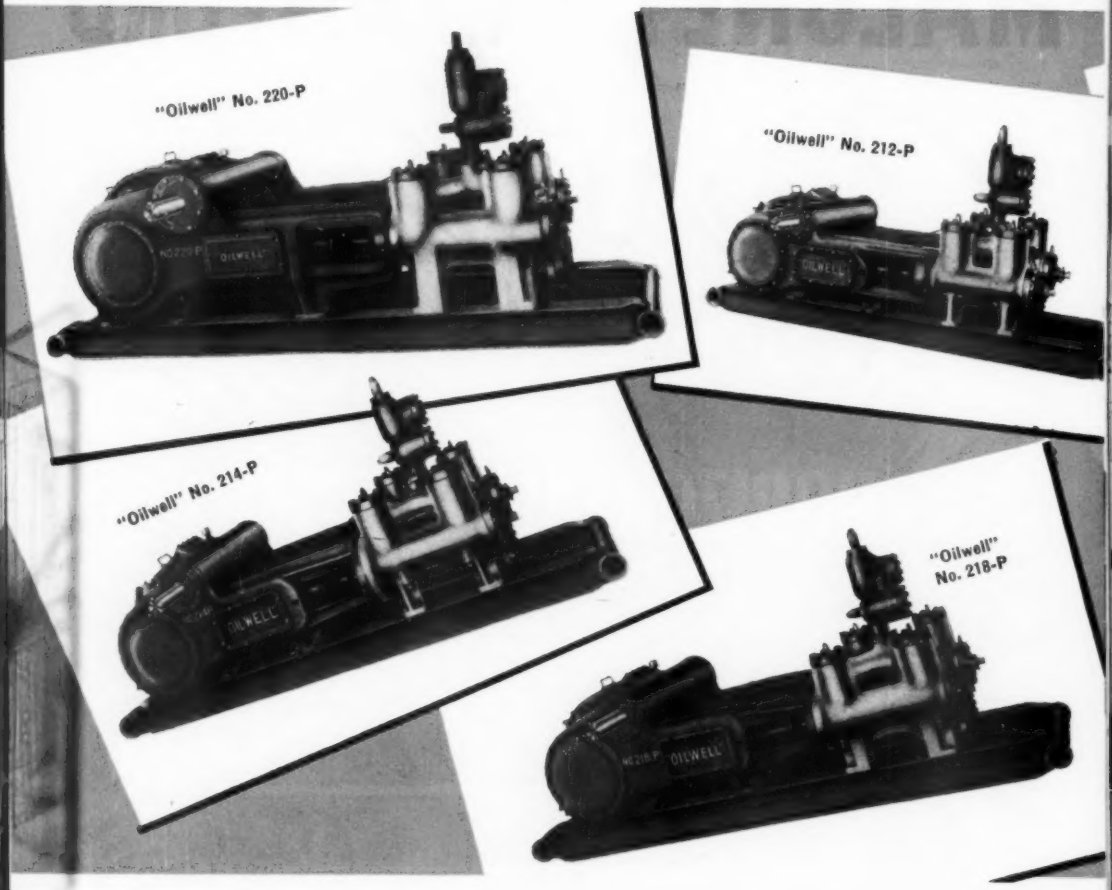
Write for Bulletin S-100 for details

MALONEY CRAWFORD

MALONEY - CRAWFORD TANK & MFG. CO.

Box 659 **TULSA, OKLA.**

Pick the right pump for your job



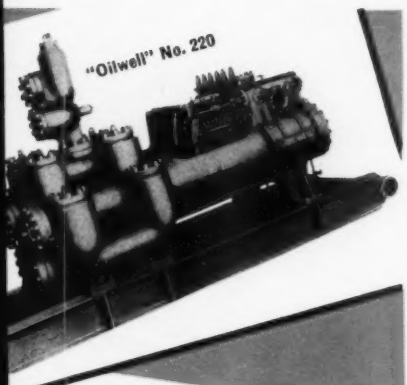
BRIEF SPECIFICATIONS—Power Pumps

Pump (Type Number)	Maximum Fluid Liner (or Plunger) Size and Stroke Inches	Rated R.P.M.	Recommended B.H.P. at Rated R.P.M.	Maximum Working Pressure with Full Size Liners (or Plungers) P.S.I.	Displacement (Piston Rods Deducted) U.S. Gallons Per Revolution	Rated Fluid Chamber Pressures P.S.I.	
						Suction	Discharge
No. 220-P	8 x 20	60	600	880	16.58	3,000	4,000
No. 218-P	7¼ x 18	60	450	890	12.24	2,000	3,000
No. 214-P	7¼ x 14	65	325	765	9.51	1,500	2,500
No. 212-P	7¼ x 12	70	220	550	8.29	1,000	2,000
No. 612-P	6 x 12	70	140	520	5.60	900	1,800
No. 810-P	8 x 10	85	116	250	8.55	125	250
No. 610-P	6¼ x 10	85	116	385	5.17	500	1,000
No. 510-P	5 x 10	85	116	615	3.25	750	1,500
No. 8P-HD	5 x 8	80	85	600	2.58	900	1,800
No. 6P-HD	4 x 6	100	40	455	1.26	500	1,000
No. 6P-LD	5 x 6	100	40	285	2.00	300	600
No. 36-P	3 x 6	140	75	1,420	0.551	1,600	3,200
No. 46-P	4½ x 6	140	75	630	1.239	900	1,800
No. 48P-HD	4½ x 8	175	310	1,570	1.65	1,000	10,000
No. 558-P	5 x 8	150	350	1,275	3.39	1,000	2,500

BRIEF SPECIFICATIONS—Steam Pumps

Pump (Type Number or Designation)	Steam Cylinder Bore Inches	Max. Fluid Liner Size Inches	Stroke Inches	Rated Steam Pressure P.S.I.	Displacement (Piston Rods Deducted) U.S. Gallons Per Revolution	RATED WORKING PRESSURE	
						Suction	Discharge
No. 220	18	8	20	400	16.38	3,000	4,000
10x6¼x10	10	6¼	10	350	5.16	500	1,000
10x5x10	10	5	10	350	3.25	500	1,000
6x5x6	6	5	6	350	2.00	300	600
6x4x6-B	6	4	6	350	1.26	400	800
6x2x6-B	6	2½	6	350	0.464	500	1,500

from this complete "Oilwell" line!



CONTACT your *"Oilwell"* representative for detailed information about the many different pumps in the "Oilwell" line. He will gladly help you choose the pumps best fitted to your needs.

"Oilwell" Pumps are designed for a wide variety of uses.

Rotary Drilling • Pipe Lines • Refinery • Water Flooding
Salt Water Disposal • Mud Mixing • Oil Gathering
Water Supply • Portable Rotary Rig Drilling
Exploration Work • Well Servicing • Cementing
Acidizing • Terminal & Dock Loading

"Oilwell" Pumps for special purposes are also available.

OIL WELL SUPPLY DIVISION
UNITED STATES STEEL COMPANY

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Export Office—
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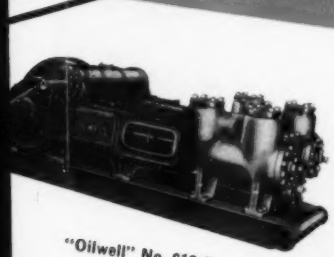
NEW YORK 20, N. Y.

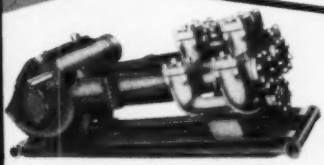
Area Offices— CALGARY, CANADA
CASPER, WYOMING . . . COLUMBUS, O.
DALLAS, TEXAS . . . HOUSTON, TEXAS
TULSA, OKLA. . . . LOS ANGELES, CALIF.

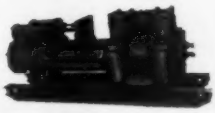
Branches Serving All Oil Fields


"Oilwell" No. 612-P

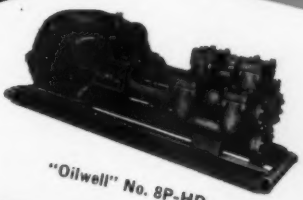
"Oilwell" No. 48P-HD

"Oilwell" No. 558-P


"Oilwell" No. 510-P
"Oilwell" No. 610-P
"Oilwell" No. 810-P


"Oilwell" 10x5x10
"Oilwell" 10x6¼x10

"Oilwell" No. 36-P
"Oilwell" No. 46-P


"Oilwell" No. 8P-HD

"Oilwell" 6x5x6
"Oilwell" 6x4x6-B
"Oilwell" 6x2x6-B

"Oilwell" No. 6P-HD
"Oilwell" No. 6P-LD

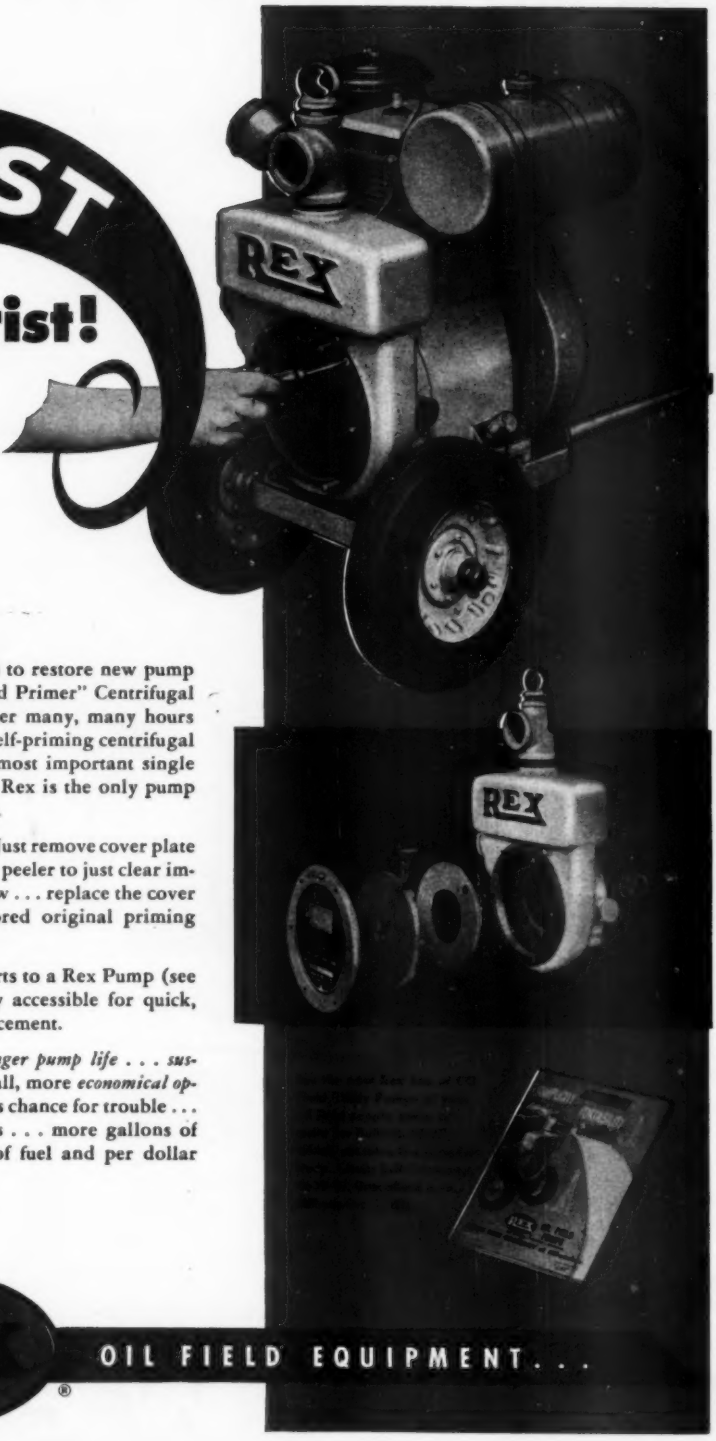
USS TRADE MARK

"OILWELL"

TRADE MARK

UNITED STATES STEEL

just a TWIST of the wrist!



. . . That's about all it takes to restore new pump efficiency to the Rex® "Speed Primer" Centrifugal Self-Priming Pump even after many, many hours of rugged service. In every self-priming centrifugal pump, the air peeler is the most important single factor in priming efficiency. Rex is the only pump with an *adjustable* air peeler.

HERE'S HOW SIMPLE IT IS! Just remove cover plate . . . remove one bolt . . . drop peeler to just clear impeller . . . tighten the setscrew . . . replace the cover plate . . . and you've restored original priming efficiency.

There are only 6 basic parts to a Rex Pump (see illustration) . . . all readily accessible for quick, easy maintenance and replacement.

This simplicity means *longer pump life . . . sustained efficiency* and, above all, more *economical operation*—with Rex there's less chance for trouble . . . far lower maintenance costs . . . more gallons of liquid pumped per dollar of fuel and per dollar of cost.

REX®

OIL FIELD EQUIPMENT . . .

OUR "LABORATORY" EXTENDS OVER THOUSANDS OF MILES

Every oil field in the free world is in a sense an extension of the big Halliburton laboratory in Duncan.

Each has contributed to the vast store of knowledge that directs the design of Halliburton cementing equipment and every detail of Halliburton procedure.

Each has added to the tremendous total of cementing jobs successfully completed by the Halliburton organization—a total that exceeds the million mark.

Each has helped us to render constantly improved service at an average cost that is actually less today than in 1924.

Erle P. Halliburton

Chairman of the Company

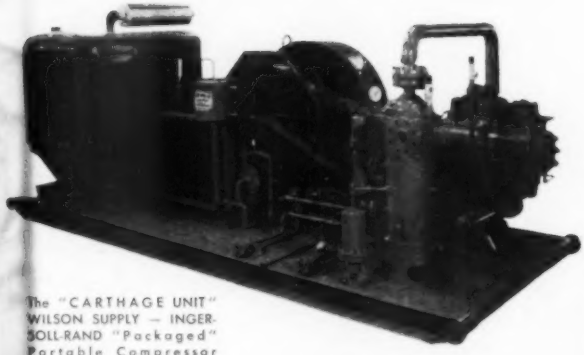
HALLIBURTON OIL WELL CEMENTING CO.

Duncan, Oklahoma

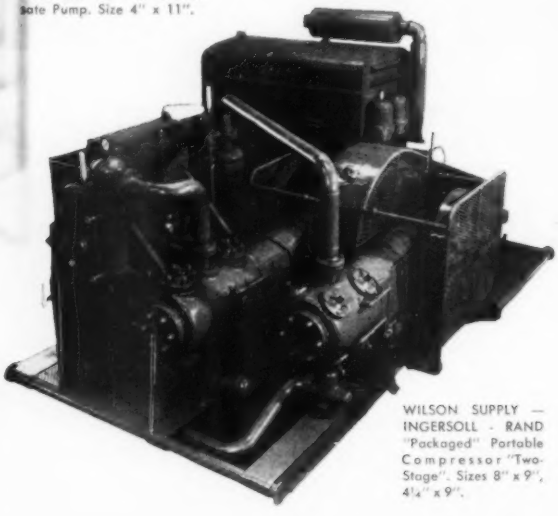
WE DO OUR OWN FABRICATING

The photograph above shows one corner of the "Fabricating Shop" of Wilson Supply Company. It is in this shop that all Wilson Supply — Ingersoll-Rand "Packaged" Portable Compressors are fabricated—mounted on heavy skids—and readied for immediate service in the field.

The experience gained through the fabricating of several hundred of these units has proven of great value in assuring maximum trouble free performance when they are put in service.



The "CARTHAGE UNIT" WILSON SUPPLY — INGERSOLL-RAND "Packaged" Portable Compressor Equipped with Kluppel Automatic Off and On Condensate Pump. Size 4" x 11".



WILSON SUPPLY — INGERSOLL - RAND "Packaged" Portable Compressor "Two-Stage". Sizes 8" x 9", 4¼" x 9".

Contact your nearest Wilson Supply Store or write "Compressor Division," Wilson Supply Company, P. O. Drawer 19, Houston, Texas, for detailed information and quotations. Please give suction and discharge pressure and volume to be handled.

WILSON SUPPLY COMPANY

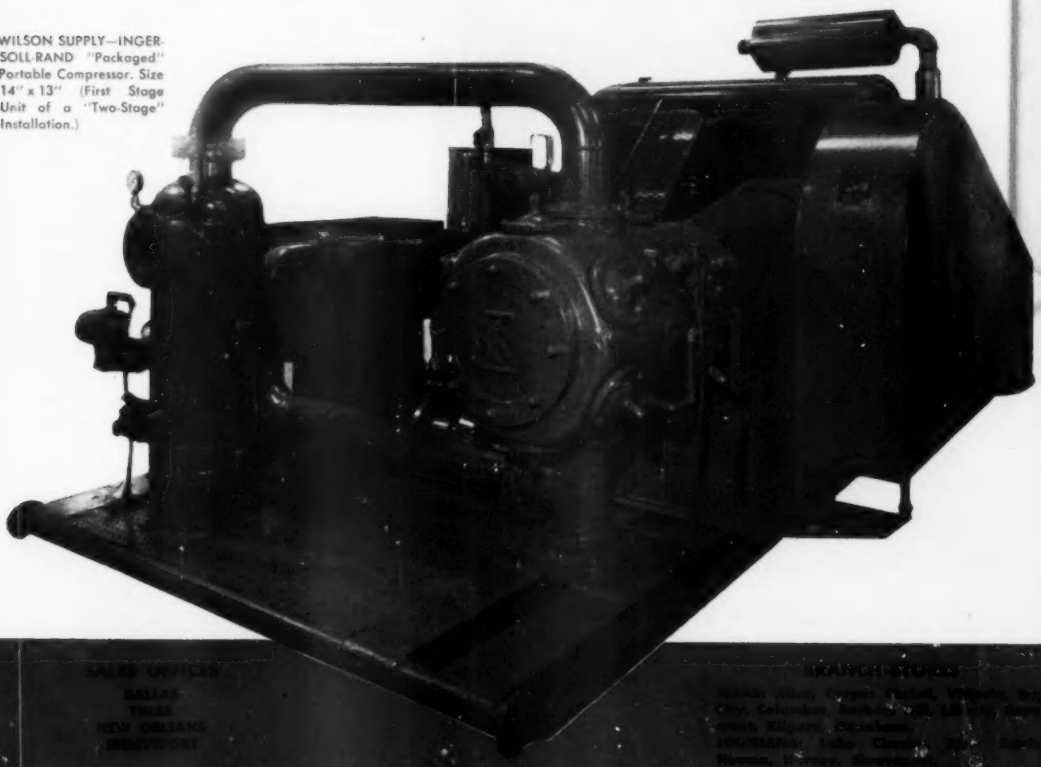
1412 Maury St. HOUSTON, TEXAS

NOW .. is the Time to Check on Your Need for Wilson Supply—Ingersoll-Rand "*Packaged*" PORTABLE COMPRESSORS

Throughout the Industry—especially in the Southwest—Compressors are often becoming a "must".

The great demand for Wilson Supply—Ingersoll-Rand "Packaged" Portable Compressors for Gas-Oil Lift, Repressuring and Booster work, coupled with the critical material supply, has created a situation that often tends to unavoidable delay in deliveries.

While Wilson Supply Company has many sizes of Compressors in stock or on order —varying field conditions and requirements make it impossible to carry all sizes of compressor cylinders and engines. Therefore the Producer who can should anticipate his compressor needs as far in advance as possible—so that delivery can be made when the need arrives.



WILSON SUPPLY—INGERSOLL-RAND "Packaged" Portable Compressor. Size 14" x 13" (First Stage Unit of a "Two-Stage" Installation.)

Drillers Who Know Their 3 C's

- COST of Replacement
- COST of Downtime
- COST of Operating

J&L STEEL

Are turning to J&L Wire Rope

It doesn't take a wizard at mathematics to figure out that low operating costs mean economical operation and higher profits. That's why more and more smart drillers throughout the oil country are ordering J&L drilling lines for their rotary or cable tool rigs. Experience has proved that they'll get maximum service life—maximum hole per wire rope dollar with J&L.

The long service life of J&L Wire Rope is due to J&L's "quality controlled" method of manufacture. "Quality control" ensures the finest finished product by controlling every step in the manufacture of the wire rope from the mining of the ore to the final stranding and closing operations.

The result—long service life on the job, that's reflected on the balance sheet in low cost for wire rope, minimum downtime for rerigging and less man-hours spent installing new lines—in short, lower operating costs.

In addition, the popularity of J&L Wire Rope in the oil country is built on more than long service life. The men on the rigs like it too because it's easy to handle, spools smoothly, and is lubricated with J&L's exclusive Bronze-lube—the lubricant that's clean to handle, doesn't run out when the line gets warm.

If you're not already using J&L drilling lines, it will pay you to find out more about J&L quality controlled Wire Ropes. Why not contact your nearest J&L Wire Rope representative today?

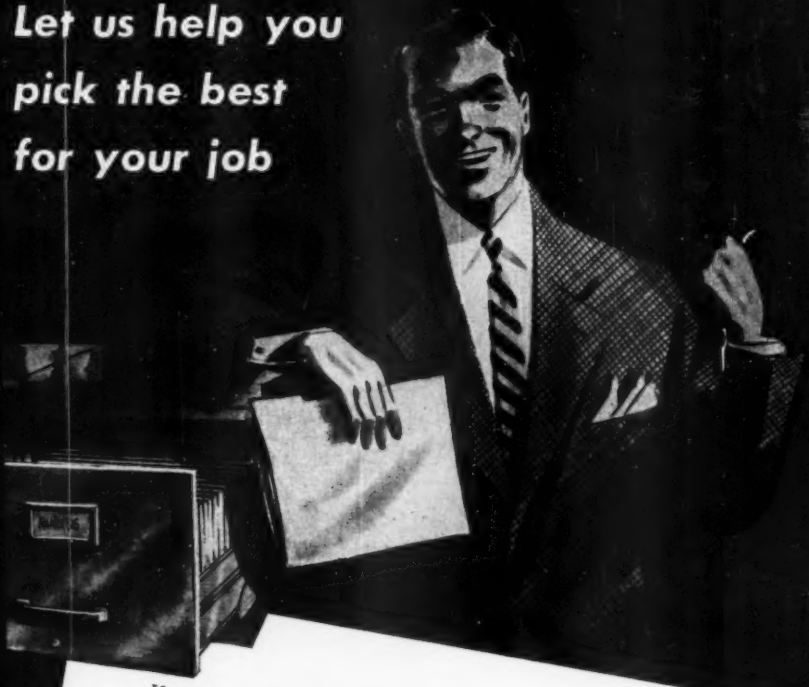
JONES & LAUGHLIN STEEL CORPORATION

From its own raw materials, J&L manufactures a full line of carbon steel products, as well as certain products in OTISCOLOY *and* JALLOY *(hi-tensile steels).*

PRINCIPAL PRODUCTS: HOT ROLLED AND COLD FINISHED BARS AND SHAPES • STRUCTURAL SHAPES • HOT AND COLD ROLLED STRIP AND SHEETS • TUBULAR, WIRE AND TIN MILL PRODUCTS • "PRECISIONBILT" WIRE ROPE • COAL CHEMICALS

Here are 25 different steel tubing analyses

Let us help you pick the best for your job



Low Carbon
Low Carbon, ½ Mo
Low Carbon, 1 Mo
½ Cr, ½ Mo
1¼ Cr, ½ Mo
2 Cr, ½ Mo
2¼ Cr, 1 Mo
2½ Cr, ½ Mo, ¾ Si
3 Cr, ½ Mo, 1¼ Si
3 Cr, 1 Mo
5 Cr, ½ Mo
5 Cr, ½ Mo, 1½ Si
5 Cr, ½ Mo, Ti
7 Cr, ½ Mo
8 Cr, ½ Mo
8 Cr, 1 Mo
9 Cr, 1 Mo
12 Cr, Al
17 Cr
27 Cr
18-8
18-8 Ti
18-8 Cb
18-8 Mo
25-20

If you select steel tubing for refinery operations, you undoubtedly have a good idea of the possibilities and limitations of certain analyses.

But you can't possibly spend the time to learn how each analysis stands up under the many combinations of heat, pressure, and corrosive chemicals.

That's where we can help you. We have a tremendous file of authentic case histories dealing with different steel tubing analyses. If you have a problem, we may be able to offer a complete record of several analyses that have been used for that specific application.

This information is particularly valuable today, when certain grades of steel are in short supply. We can help you select alternates that will often do as good a job, sometimes at an even *lower* cost.

So make National Tube Company your headquarters for up-to-date, reliable information on steel tubing. There's no obligation, of course, and we'll be glad to give you all the help and information that we can. Write for Bulletin Number 26. Address National Tube Division, 525 William Penn Place, Pittsburgh 30, Pa.

NATIONAL TUBE DIVISION
UNITED STATES STEEL COMPANY, PITTSBURGH, PA.
(TUBING SPECIALTIES)
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

National Seamless is actually pierced from a solid billet of high-quality steel. It's the one manufacturing method that removes all doubt concerning uniform wall strength.

WALLS WITHOUT WELDS

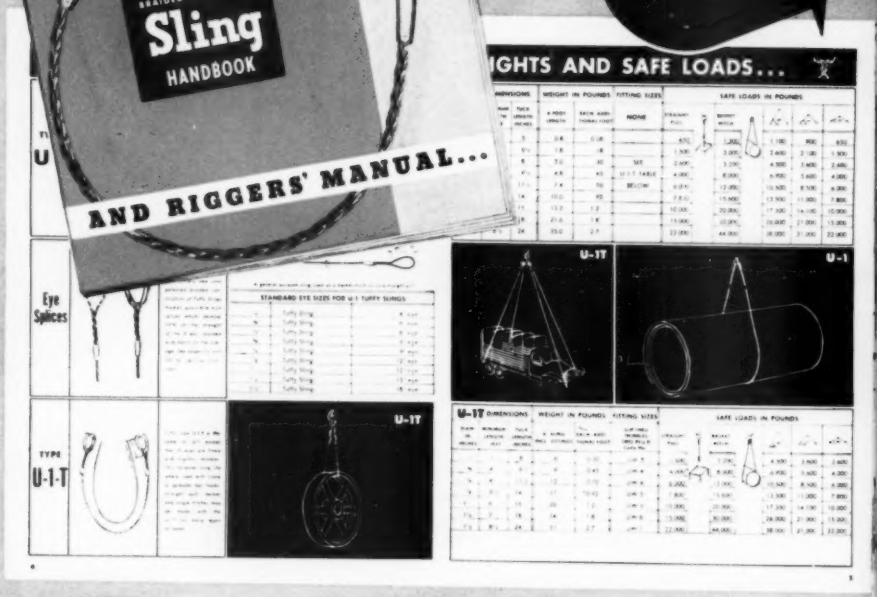
USS TRADE MARK

NATIONAL SEAMLESS PIPE AND TUBES

UNITED STATES STEEL

Just Off
to Help

Free!



UNION WIRE ROPE CORP

union Wire Rope

he Press and Ready
ou Cut Sling Costs!

nly Handbook of its Kind in the ling Field. You just can't measure Tuffy Slings by e old sling standards. Because of the new characteris-cs and efficiencies developed in Tuffy's 9 part, machine raided wire fabric construction, all users of slings need is Sling Handbook to know the facts about lower sling sts through longer sling service. You can have it FREE r the asking. It gives you—

actual Data On 12 Sling Types nd On Various Types of Sling Fit-ings. That's right, all the working data—dimen-ons, weights, safe loads, standard eye sizes, tuck lengths, zes and data on standard and special fittings, straight ll, basket, choker and angle hitches, simplified ordering rocedure, etc., on 12 factory fitted and factory packaged ing types. Also there is valuable information on sling re and on braided wire fabric for rigging your own slings.

0 Illustrations of Sling Uses—help u determine the types to fit your sling jobs. Should none the 12 factory fitted types exactly fit, then the hand-ook tells how our engineers develop special types for ecial uses.

tep by Step, Illustrated Instruc-ions On Splicing Both Tuffy Slings nd Wire Rope. Splicing the braided wire fabric Tuffy Slings is made easy with visual instructions. And, make the sling handbook doubly useful, it contains 24 ges of visual instructions on making 7 kinds of wire pe splices, attaching sockets, ferrules and thimble clamp. fficiencies of wire rope attachments, as established by tual strength tests, are tabulated.

ou'll find this Sling Handbook and Riggers Manual easy use and highly useful. A copy is yours with our com-liments. Simply fill out and send the coupon.

Tie a knot in a Tuffy Sling. Note its flexibility. Pull the knot tight—then untie it. See how readily the patented braided fabric straightens out again.

It's hard to do by hand without the aid of a vise. If you are able to kink a Tuffy, then see how easily the patented braided wire fabric straightens out without material damage.

Get FREE Sling Sample—See For Yourself All The Advantages of Tuffy Slings

To see how entirely different they are you just have to handle and try out a Tuffy Sling. That's why we have made up a supply of 3 ft. samples. Get yours and prove for yourself Tuffy Sling superiority. Fill out the coupon—It's FREE.

UNION WIRE ROPE CORPORATION

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lease send FREE of Cost—

] Tuffy Sling Handbook

] 3 ft. Sample of Tuffy Sling

*Name*_____

*Title*_____ *Company*_____

*Address*_____

*City*_____ *State*_____

GM Diesel
Case History No. 5211-12

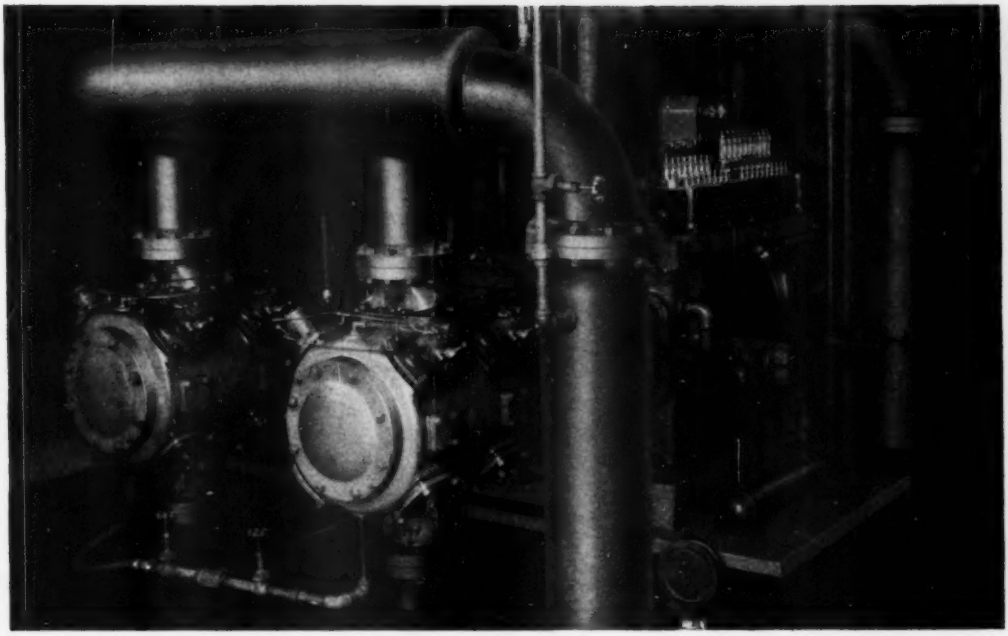
USER: Al Buchanan Drilling Company, San Antonio, Texas. Rig No. 9.

INSTALLATION: Three GM Diesel "Twin 6" torque-converter units, powering a Clark-Ideco PR-1000 rig. Replaced other GM Diesels that had given four years' continuous trouble-free service. Bought new GM Diesels to get dual-fuel torque-converter units.

PERFORMANCE: Since July, 1950, engines have drilled more than 85,000 feet of hole (one well 12,000 feet deep). Maintenance costs negligible and owners report, "we are happy to recommend GM Diesels."

This Diesel Gives Drillers More Power

GM
GENERAL MOTORS
DIESEL POWER



SAVINGS... even before the word GO!

Great Lakes Refining selects the compressors that simplify erection and firewall installation

When Great Lakes Refining Co. was planning its new Houdriflow cat cracking unit at Blue Island, Illinois, one of the prime requirements was a low fire hazard compressor installation for vapor recovery service.

What type of compressor should be used? The decision was easy after Clark engineers made a thorough analysis carefully considering gas and steam engine driven units, motor driven reciprocating units and centrifugal compressors. Building all types of compressors, Clark was unusually qualified to make this comparison—*impartially!* Recommendation: Two Clark CMA-4, 300 bhp, Balanced/Opposed, Synchronous Motor Driven Compressors.

Of major importance was adaptability to firewall type construction. Having a single unit crankcase with the driving motor on the end, it would be a simple matter to isolate the motor from the Clark Balanced/Opposed Compressor. The shaft would merely extend through the firewall, with a simple packing gland sealing out the gas.

Costwise, Great Lakes Refining was ahead from the day the order was placed. Considerable time and cost in installation were saved by shipping the unit completely assembled. Vibration-free operation —*the result of perfect balance*— paid off in smaller foundation cost and will *continue* to pay off in practically maintenance-free operation.

For details on this truly modern compressor, write for Bulletin No. 118. For complete information on *all* your compressor problems, call in the nearest Clark representative for an unbiased answer.

CLARK BROS. CO., INC. • OLEAN, N. Y.

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COMPRESSORS

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the JOHNSTON Open Hole Tester today.

Proved in thousands of tests, the Johnston Open Hole Tester is stretching the short supply of casing into the largest number of producers, because it tells you the productive possibilities of your well **before** you set casing.

Stretch your casing into the right hole — call Johnston when it is time to test. Experienced representatives operate in all active areas twenty-four hours a day.

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There's a Johnston Service Representative Near You

FORMATION AND CASING TESTING — JOHNSTON

They Say—

Anyone Top This?

Sir:

I have been doing some leasing close to the recent Oriskany gas discovery in Ohio, and while trying to get a farmer to sign on the dotted line today the fellow, who has never been leased or has never seen a lease before, came up with this:

"It says here that the lessee to deliver to lessor in tanks or pipe lines one-eighth of oil produced and saved from the premises. Now look here, young man, I just don't like that, because I don't know what I would put the oil in."

Well, after a lot of explaining I thought I was all set for his signature when he said: "Hold on, here. It says 'lessor shall be entitled to free gas for one dwelling and shall use said gas at his own risk with economical gas-burning appliances.' Now just what brand stove would you want me to buy; would an Estate be all right?"

George Kissling, Jr.,
Pomeroy, Ohio.

Dark Horse in Kansas

"Kansas still may be the wheat state. Live stock may be its biggest industry. But petroleum is now a member of the threesome and is a good runner-up."

Editorial in the Kansas City Star.

No Loopholes Here

"To say that the oil industry enjoys special tax treatment is absurd, for the industry, with 3 per cent of the national income, pays about 7 per cent of all taxes—federal, state and local.

"In 1950, the value of total domestic crude production at the well amounted to 5 billion dollars. The 3½ billion dollars collected by government in 1950 from taxes on the oil industry and its products was equal to 70 per cent of the value of the crude."

Daniel C. McCarthy, Socony-Vacuum Oil Co., Inc., addressing the Oil Men's Club of Kansas City.

Timely Question

"What the ultimate result may be is problematical. The House twice has passed, overwhelmingly, bills to restore the tidelands to the states. If the Senate passes such a bill, quick congressional enactment into law is assured. But, equally assured is a presidential veto, so long as Mr. Truman is president. He has promised that repeatedly. But that obstacle must not be allowed to lessen congressional efforts. After all, Mr. Tru-

PEAK POLISH ROD LOADS ELIMINATED

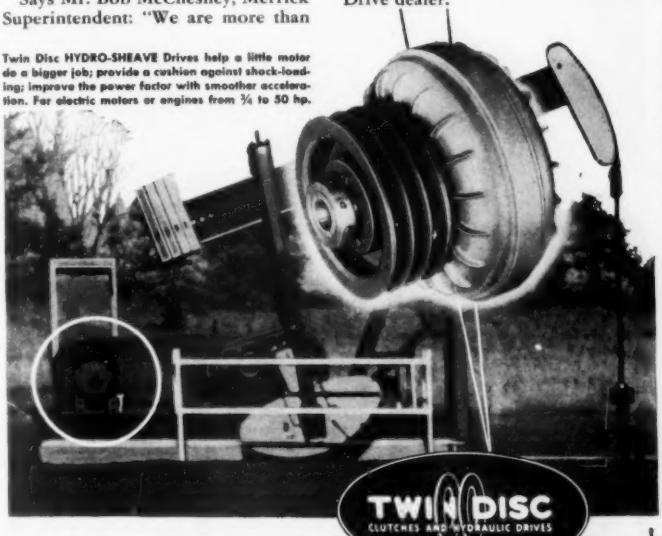
with TWIN DISC HYDRO-SHEAVE® DRIVES

Smoothing the power on 50 Cabot Pumping Jacks in the Ward S. Merrick holdings in the Graham Fox Pool and Bayou area of Carter County south of Lone Grove, Oklahoma, are Twin Disc's famous HYDRO-SHEAVE Drives. Bought to (1) increase pumping efficiency, (2) reduce initial motor cost, and (3) reduce excess current demands, these fluid drives *are* saving money on all three counts. That's why *more and more* HYDRO-SHEAVES dot the oil country.

Says Mr. Bob McChesney, Merrick Superintendent: "We are more than satisfied with the operation of the HYDRO-SHEAVE Drives due to smoother starting and the elimination of peak polish rod loads. Since using these units for the last three years we have had no belt failures. We are using 5 hp. motors on 4500 foot wells. Pumping units operating at this depth require 7½ hp. motors when not equipped with HYDRO-SHEAVE Drives."

Get the HYDRO-SHEAVE story from your nearest Twin Disc Hydraulic Drive dealer.

Twin Disc HYDRO-SHEAVE Drives help a little motor do a bigger job; provide a cushion against shock-loading; improve the power factor with smoother acceleration. For electric motors or engines from ¾ to 50 hp.



TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC DIVISION, Rockford, Illinois

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See your WILLSON distributor or write for catalog

man won't be president forever—will he?"

Editorial in the Shreveport Times.

Interest in Education

"The many fine tax-supported public colleges, which are controlled by state and local governmental agencies, will continue independent only so long as a strong, vigorous and competing system of privately endowed education continues.

"I believe that every American business has a direct interest in the preservation of free, independent, privately endowed colleges and universities."

A. A. Stambaugh, chairman of the board of Standard Oil Co. (Ohio), announcing a $35,000 grant to the Ohio Foundation of Independent Colleges.

CALENDAR

March

Western Petroleum Refiners Association, annual meeting, Plaza Hotel, San Antonio, March 31-April 2.

Mid-West Gas Association, annual meeting, Hotel Radisson, Minneapolis, Minn., March 31-April 2.

American Chemical Society, division of petroleum chemistry, annual meeting, Milwaukee, March 31-April 3.

April

Pacific Coast Gas Association, annual transmission conference, Berkeley, Calif., April 2-3.

Oil and Gas Conservation Institute, University of Oklahoma, Norman, Okla., April 2-3.

American Petroleum Institute, Division of Production, eastern district, Hotel William Penn, Pittsburgh, April 2-4.

Florida-Georgia Gas Association, annual convention, Soreno Hotel, Saint Petersburg, April 3-5.

Missouri Liquefied Petroleum Gas Association, Hotel President, Kansas City, Mo., April 7-9.

American Society of Lubrication Engineers, annual meeting, Statler Hotel, Cleveland, April 7-9.

Illinois Oil and Gas Association, annual meeting, Mount Vernon, Ill., April 10.

Arizona Geological Society of America, forty-eighth annual meeting, University of Arizona campus, Tucson, Ariz., April 11-12.

Petroleum Industry Electrical Association and Petroleum Electrical Supply Association, twenty-fourth annual joint conference, Mayo Hotel, Tulsa, April 14-17.

American Institute of Electrical Engineers, District 7 meeting, Hotel Jefferson, St. Louis, April 15-17.

Association of American State Geologists, annual meeting, Tallahassee, Fla., April 15-19.

National Petroleum Association, semiannual meeting, Hotel Cleveland, Cleveland, April 16-18.

American Petroleum Institute, Division of Transportation, pipe-line conference, Blackstone Hotel, Fort Worth, April 21-23.

American Petroleum Institute, safety and fire-protection committees, Hotel Texas, Fort Worth, April 21-24.

National Petroleum Council, conference rooms A and B of the Interior Department Auditorium, Washington, D. C., April 22.

American Petroleum Institute, Division of Production, Rocky Mountain district, Gladstone Hotel, Casper, Wyo., April 24-25.

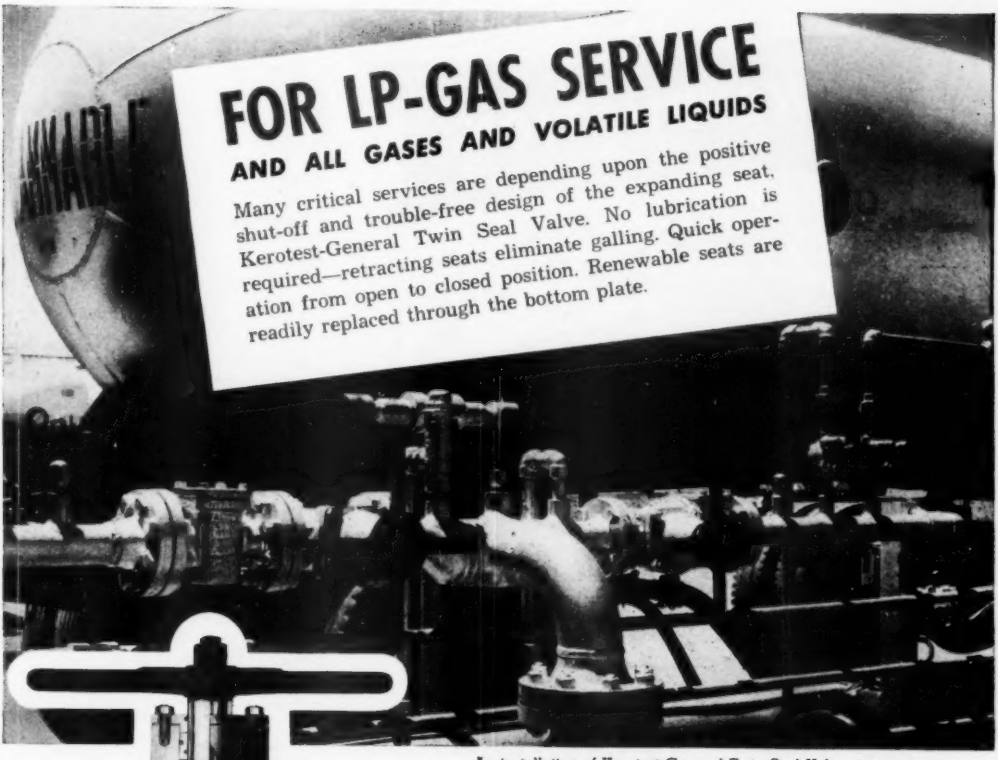
Indiana Gas Association, annual meeting, French Lick Springs Hotel, French Lick, Ind., April 24-25.

Ardmore Geological Society, field trip,

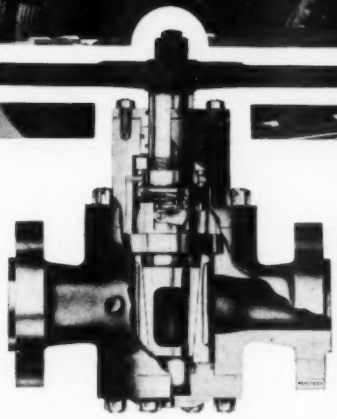
FOR LP-GAS SERVICE

AND ALL GASES AND VOLATILE LIQUIDS

Many critical services are depending upon the positive shut-off and trouble-free design of the expanding seat, Kerotest-General Twin Seal Valve. No lubrication is required—retracting seats eliminate galling. Quick operation from open to closed position. Renewable seats are readily replaced through the bottom plate.



An installation of Kerotest-General Twin Seal Valves in an LP-Gas Loading Rack



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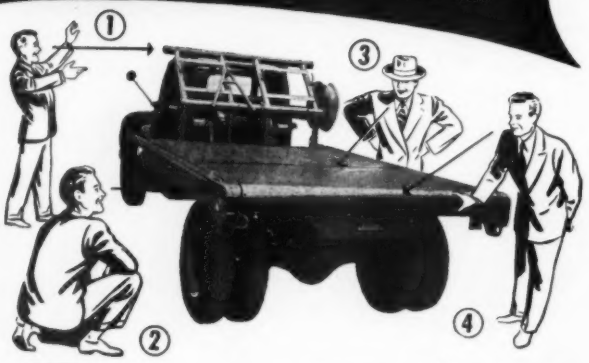
NON-LUBRICATED TWIN SEAL VALVE

WRITE for descriptive bulletin giving full specifications

KEROTEST

CONSTRUCTION



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From ALL angles—whether you're examining the famed "Packaged Unit" oil field truck body or the many nationally known lines of construction equipment—LELAND LEADS THE FIELD. Offices in Oklahoma City, Tulsa and Longview, Texas, enable Leland to give you "on the job service" saving you time and money. The "Packaged Unit", quality built for all types of construction work, is unequalled for versatility, safety design and durability. Here are a few of the outstanding features incorporated into this fine truck body:

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East of Ardmore and South of the Arbuckle Mountains, April 25-26.

Independent Petroleum Association of America, midyear meeting, Deshler-Wallick Hotel, Columbus, Ohio, April 28-29.

American Oil Chemists' Society, spring meeting, Shamrock Hotel, Houston, April 28-30.

Southern Gas Association, annual convention, Galveston, Tex., April 28-30.

American Institute of Electrical Engineers, District 1 meeting, Binghampton, N. Y., April 30-May 2.

Natural Gasoline Association of America, annual meeting, Rice Hotel, Houston, April 30-May 2.

May

Southeastern Section Geological Society of America, and Southeastern Mineral Symposium, joint meeting, Hotel Roanoke, Roanoke, Va., May 1-3.

National Air Pollution Symposium, Huntington Hotel, Pasadena, Calif., May 5-6.

American Geophysical Union, thirty-third annual meeting, National Academy of Sciences, National Research Council, Washington, D. C., May 5-7.

Texas Petroleum Research Committee, Fourth Oil Recovery Conference, Austin, Tex., May 8-9.

Interstate Oil Compact Commission, spring meeting, Phoenix, Ariz., May 9-10.

American Institute of Chemical Engineers, regional meeting, French Lick, Ind., May 11-14.

American Association of Petroleum Geologists, regional meeting, Mayo Hotel, Tulsa, May 12-13.

American Gas Association, Natural Gas Department, spring meeting, Biltmore Hotel, Los Angeles, May 12-13.

Annual Liquefied Petroleum Gas Association convention and trade show, Palmer House, Chicago, May 12-14.

American Petroleum Institute, Division of Refining, seventeenth midyear meeting, San Francisco, May 12-15.

Pennsylvania Gas Association, Wernersville, Pa., May 13-15.

Intermountain Association of Petroleum Geologists, Third Annual Field Conference, the Basin and Range Province from Cedar City, Utah, to Las Vegas, Nev., May 13-16.

American Petroleum Institute, Division of Production, Pacific Coast district, Biltmore Hotel, Los Angeles, May 15-16.

American Petroleum Institute, division of marketing, midyear meeting, Copley Plaza, Boston, May 19-20.

Gas Appliance Manufacturers Association, annual meeting, Broadmoor Hotel, Colorado Springs, Colo., May 21-23.

American Gas Association, production and chemical conference, Hotel New Yorker, New York, May 26-28.

Southwestern Gas Measurement Short Course, University of Oklahoma, Norman, May 27-29.

Society of Exploration Geophysicists, Gulf Coast regional meeting, Rice Hotel, Houston, May 29-30.

Seventh annual short course in gas technology, sponsored by the Southern Gas Association, Texas College of Arts and Industries, Kingsville, Tex., May 28-30.

June

Society of Automotive Engineers, summer meeting, Ambassador and Ritz-Carlton Hotels, Atlantic City, N. J., June 1-6.

Pennsylvania Grade Crude Oil Association, annual meeting, Hotel William Penn, Pittsburgh, June 5-6.

Canadian Gas Association, Chateau Frontenac, Quebec, June 8-12.

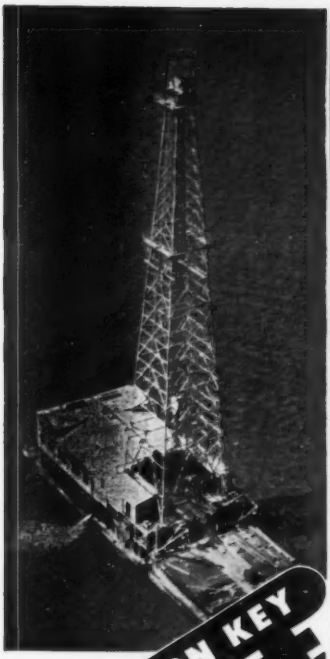
American Petroleum Institute, midyear standardization meeting, Brown Palace Hotel, Denver, June 9-14.

Western Petroleum Refiners Association, regional technical and industrial-relations meeting, Broadview Hotel, Wichita, Kans., June 12-13.

International Gas Conference, Brussels, Belgium, June 16-22.

Kentucky Oil and Gas Association, annual meeting, Hotel Lafayette and Phoenix Hotel, Lexington, Ky., June 19-20.

Petroleum Equipment Suppliers Associa-



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Levingston
SHIPBUILDING CO.
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ton, Mark Hopkins Hotel, San Francisco, June 22-25.

Michigan Gas Association, annual meeting, Grand Hotel, Mackinac Island, Mich., June 23-24.

American Society for Testing Materials, annual meeting, Hotel Statler, New York, June 23-27.

American Institute of Electrical Engineers, summer general meeting, Nicollet Hotel, Minneapolis, Minn., June 23-27.

August

Wyoming Geological Association, field trip, Big Horn Basin, August 1-3.

Society of Automotive Engineers, national West Coast meeting, Fairmont Hotel, San Francisco, August 11-13.

American Institute of Electrical Engineers Pacific general meeting, Westward Ho Hotel, Phoenix, Ariz., August 19-22.

September

Pacific Coast Gas Association, Ambassador Hotel, Los Angeles, September 3-5.

Instrument Society of America, seventh national instrument conference and exhibit, Cleveland, September 8-12.

National Petroleum Association, fiftieth annual meeting, Hotel Traymore, Atlantic City, N. J., September 10-12.

American Institute of Chemical Engineers regional meeting, Palmer House, Chicago, September 11-13.

Western Petroleum Refiners Association regional meeting, Hotel Henning, Casper, Wyo., September 25-26.

American Association of Oilwell Drilling Contractors, annual meeting, Skirvin Hotel, Oklahoma City, September 28-30.

October

Independent Natural Gas Association of America, annual meeting, Fontenelle Hotel, Omaha, Neb., October 6.

California Natural Gasoline Association, twenty-seventh annual fall meeting, Ambassador Hotel, Los Angeles, October 9-10.

Texas Mid-Continent Oil and Gas Association, thirty-third annual meeting, Hotel Texas, Fort Worth, October 13-15.

American Institute of Electrical Engineers fall meeting, New Orleans, October 13-17.

Natural Gasoline Association of America southern regional meeting, Blackstone Hotel, Tyler, Tex., October 19.

Independent Petroleum Association of America, annual meeting, Mayo Hotel, Tulsa, October 20-21.

Society of Automotive Engineers, national transportation meeting, Hotel William Penn, Pittsburgh, Pa., October 22-24.

American Gas Association, annual convention, Atlantic City, N. J., October 27-30.

American Gas Association, annual convention, Atlantic City, N. J., October 27-30.

November

Society of Automotive Engineers, national diesel engine meeting, Chase Hotel, (tentative), St. Louis, November 3-4.

Society of Automotive Engineers, national fuels and lubricants meeting, Mayo Hotel, Tulsa, November 6-7.

Gulf Coast Association of Geological Societies, annual fall meeting, Hotel Driscoll, Corpus Christi, Tex., November 6-8.

Oil Industry Information Committee, Conrad Hilton Hotel, Chicago, November 8-13.

American Petroleum Institute, thirty-second annual meeting, Conrad Hilton Hotel and Palmer House, Chicago, November 10-13.

NOMADS

Tulsa Nomads, third Friday of each month. After Five Room, Tulsa Hotel.

Dallas-Fort Worth Nomads, first Monday of each month, Greater Dallas Club.

Houston Nomads, second Monday of each month, Ye Olde College Inn, Houston.

Los Angeles Nomads, second Wednesday of each month, Jonathan Club.

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Styles illustrated
527 Jacket 528 Pants 557 Hat

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- **Positively not affected by grease, oil or gasoline**
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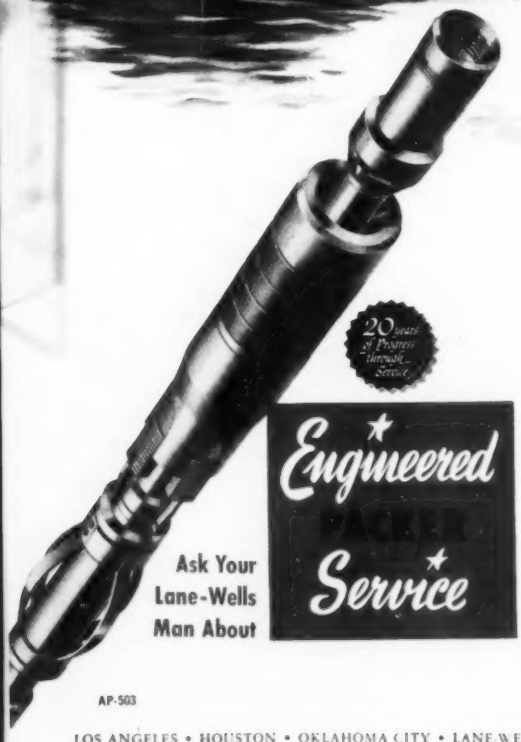

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Because they've been continually improved. Constant engineering study has developed new materials, new design features; rugged testing and severe field service have shown that today's Lane-Wells Packers successfully handle the toughest operating problems of today's deeper drilling. And the work of improvement goes steadily on — that's Engineered Packer Service!

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JOURNAL
TULSA, OKLAHOMA

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JOURNALLY Speaking

Eager Beaver

THREE cheers for the spunk and spirit of the town of Beaver, county seat of Beaver County out in the Oklahoma Panhandle! The irate citizenry of this up-and-coming community succeeded in making the Oklahoma Nomenclature Committee change its mind about the name of a new oil field, something which, we have been told (though perhaps by disgruntled persons), is a mighty hard thing to accomplish.

Quite recently a new oil field (first in the county) was brought in only a mile from Beaver. But because there has long been a Beaver field in Stephens County, Oklahoma, the nomenclature committee christened the new field with the name of Forgan, after a much smaller burg (according to Beaverites) 7 miles away. With righteous indignation and outraged civic pride the good people of Beaver descended en masse on the startled nomenclature committee demanding redress of this overt insult. The committee bowed. It's now and henceforth will be Beaver Panhandle field, and everybody (except maybe Forgan) is happy. Beaver has the kind of spirit that may make it a real oil town some day.

Musical Oil

THE recent Mid-Continent tour of the Dow Male Chorus reminds us that for some time we have had it in mind to put in a verbal plug for the extracurricular musical activities of oil and other companies. Quite a few concerns in the industry encourage man's innate urge for melodious outburst by sponsoring organized choruses among their employes, and we're all for it. Others sponsor various sorts of athletics, and that's okay, too, and serves the same purpose for many folks, only we, personally, just happen to like singing better than basketball or bowling.

However, very few outfits in this or any other industry can boast the musical preeminence achieved by the employes of the home office of Dow Chemical Co. at Midland, Mich. They have a male chorus of 100 voices, a girls' chorus even larger, a 70-piece symphony orchestra, and several other ensembles and what the hepcats call combos. They're all so good that when they go on tour people jam the halls to hear them. That angle, however, is incidental to the main point that for people who like to sing, there's nothing like group singing to push aside the worries of business and build a spirit of good fellowship. Just watch any gang of guys who get off in a corner and put their arms on each other's shoulders for a little barbershop harmony. And the result doesn't have to sound very good to listeners in order to benefit the singers. Here's for more music all over the oil patch.

Why Men Move

EVERY time we hear of an oil man changing his job or his address we send him a postcard asking for the dope to pass on for the information of his friends in the industry. The other day a couple of replies came in which may (or may not) help explain why oil men move around so much. Announcing his establishment at Mattoon, Ill., one independent producer explained: "Retired in Florida for 2 years. Became tired of being retired." And another independent explained his move from Denver, Colo., to Arcadia, Calif., with the laconic statement: "Better location (more horse racing)."

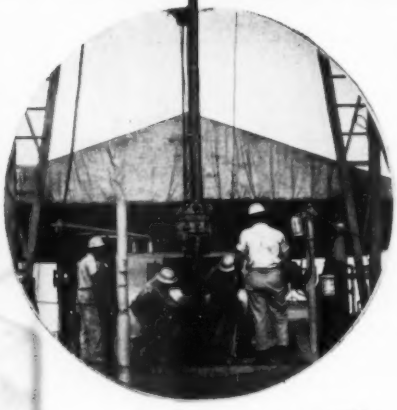
Where We Started

YOU'VE heard the old line about not taking in wooden nickels. Up in Canada they're taking nickel in wooden lines. International Nickel Co. has 40 miles of wooden pipe lines through which it pumps nickel ore and mine tailings, ground to a powder and mixed with water to form a slurry. Congratulations to the mining industry for taking the progressive step of experimenting with pipe-line transportation. The oil industry started with wooden pipe lines, too, about 90 years ago, and has made quite a few improvements since.

—Henry D. Ralph.

A Big Job

NEEDS THE RIGHT EQUIPMENT



● Drilling an oil well is a big job...particularly when footage runs miles deep. Takes the right kind of rig...with skilled, experienced men to handle all operations.

Making quality cement is a big job, too—demanding the best in equipment and personnel. Size of the operation is suggested by the cement kilns—great steel cylinders, some as long as 400′ by 11′-6″ diameter. Here, high-grade raw materials, exactly proportioned to assure the required properties in performance, are fused and combined into finished cements to meet the wide range of exacting oil-field service.

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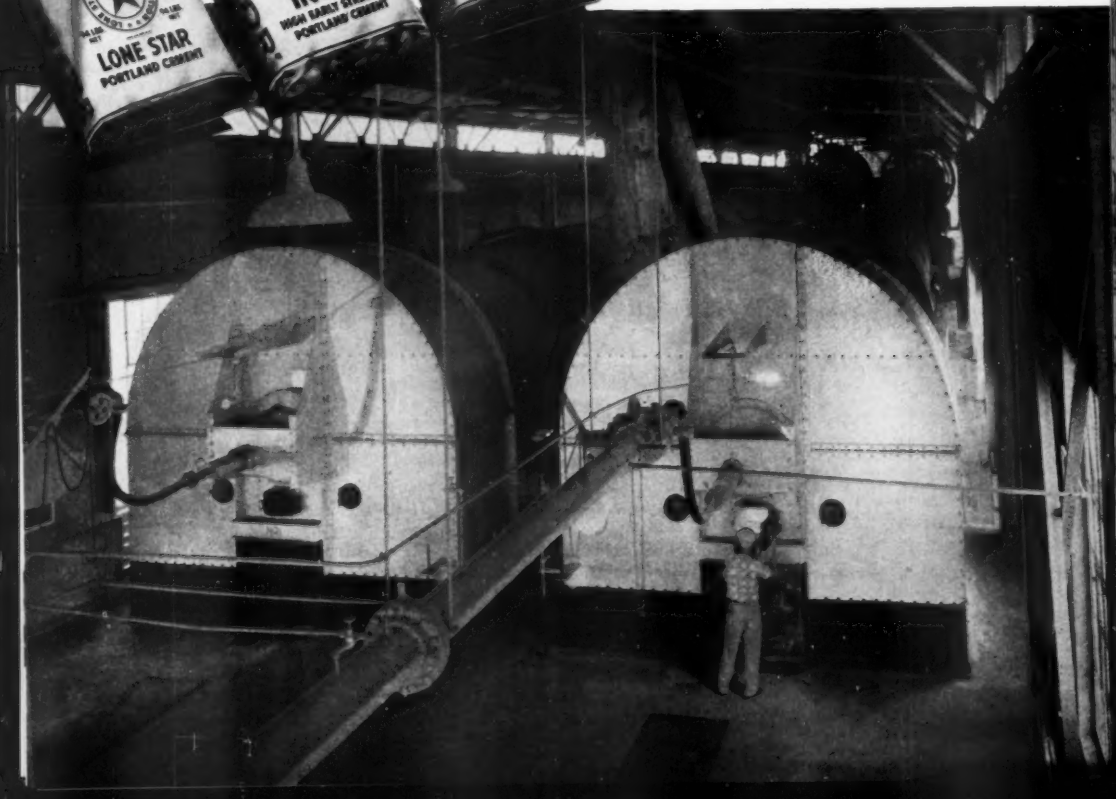


NEXT WEEK

• **Engineering Reference Section.** A new weekly feature prepared for clipping and filing will deal with various engineering problems encountered in petroleum operations. Pages on **Corrosion, Modern Drilling, Questions on Technology,** and **Progress in Metals** will also be included with the usual clipping pages. These features will be combined in a special section running from 6 to 8 pages weekly.

REGULAR DEPARTMENTS

They Say	43
Calendar of Events	44
Journally Speaking	49
Editorial	53
This Week	54
Watching Washington	61
International News	73
Personals	77
Deaths in the Industry	79
Books	97-115
On the Job	106
Questions on Technology	114
Corrosion and Its Control	122
Engineering Fundamentals	125
Refiner's Notebook	127
Equipment Digest	129
Natural-Gas News	133
Natural-Gasoline News	133
Refining News	134
Pipe-Line News	138
Drilling Contractors	142
Active Rotary Rigs	142
Exploration Statistics	166
Production Statistics	167
Refining Statistics	168
Market Statistics	169
Equipment Men in News	170
Classified Advertising	173
Advertisers' Index	177

EXPLORATION—DEVELOPMENT

Morphology of the Bloop	145
Highlights of Week	145
Reports by Areas	146

THE OIL AND GAS JOURNAL

Vol. 50, No. 47

CONTENTS FOR MARCH 31, 1952

NEWS FEATURES

More Liberal Use of Drill in Oil-Finding Favored by Morgan	55
A.A.P.G., S.E.G., S.E.P.M. Present 1952 Achievement Awards	56
Rising Costs, Narrowed Profits Create Need for Hike in Gas Rates	57
Humble Places 400-Mile Microwave System in Operation in Texas	58
Wildcat Discovers Delaware Basin's First Significant Deep Production	59
DPA Grants Fast Tax Write-Offs on 58 More Oil and Gas Projects	60
NPA Fights Imposition of Federal Controls for Industrial Safety	62
WSB's Steel Decision Expected to Affect Oil-Industry Negotiations	63
Gulf Applies Heat Treatment to Long-Distance Crude Line	65
Contractors Find Depreciation Rates Too Low for Rig Replacement	66
Union Seeking Average Crude-Price Hike of 60 Cents Per Barrel	69
French, British, Belgian, and American Firms Seek Oil in Africa	73
Argentina Buys Subsidiary of Socony-Vacuum and The Texas Co.	75
Gulf Reveals Details of Extensive Reorganization in Kuwait	75
Danish-American's Tonder Well May Be Denmark's First Oil Strike	76

ENGINEERING - OPERATING FEATURES

Renewed Interest in Lake Fausse Pointe Field 80
New wildcat completed in this Louisiana field. Total of 3,250,000 bbl. of oil has now been produced from 14 wells. By Walter Rose, Gulf Coast district editor.

Vacuum Truck Proves Versatile Tool 82
Certain refinery-cleaning operations are best accomplished by this means. By S. J. Artese, Shell Oil Co.

Sulfur From Hydrogen Sulfide 84
Sulfur-conversion plants of as little as 5 tons per day capacity can be profitably operated. By Dr. J. L. Parker, Girdler Corp.

Drilling and Completing in the Spraberry Trend 86
Over 582 producing wells and over 200 operating rigs in this active area. By Leonard O. Franklin, Magnolia Petroleum Co.

Definition of a Crooked Hole 98
Present deviation clause in drilling contracts is inadequate. By R. B. McCloy, Stanolind Oil & Gas Co.

Transco's Deep Marine Crossing at Arthur Kill 101
Novel plant involves rotation of floating, bent sections from horizontal to vertical positions. By Raymond Crowe, Transcontinental Gas Pipe Line Corp.

New Charts Aid Cost Estimating for Rotary Wells 108
This new Journal feature provides standardized charts which include all essential factors in drilling and completing rotary wells.

Questions on Technology—Yield and Viscosity Breaking, Part 3 114

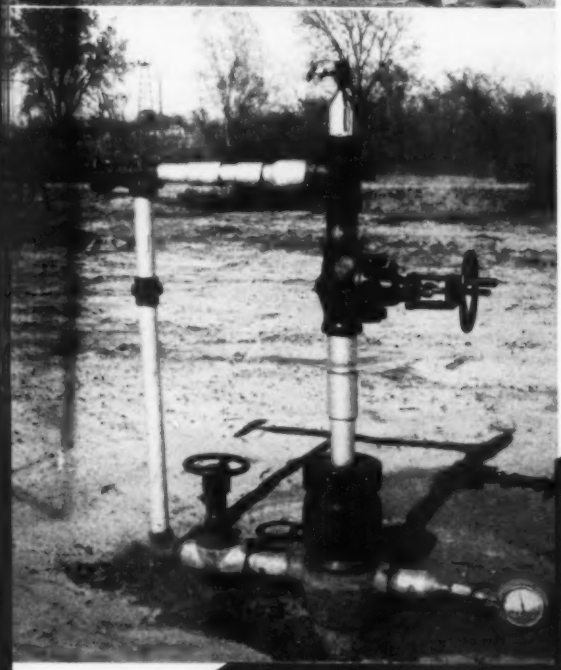
Laying Northeastern Gas Line in Massachusetts 118
Work in Berkshire hills rated most difficult in the country. By Paul Reed, Pipe Line Editor.

Corrosion and Its Control 122

Engineering Fundamentals 187

Refiner's Notebook—Bellows Relief Valves 213

Oil and Gas Equipment Digest 229



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"Proven" reserves prove many things

EVERY man in the oil business should be familiar with the published figures on proven reserves of crude oil and natural gas in the United States. The figures have an important bearing on the future course of the industry and they can be used with telling effect in the all-important program of increasing public understanding.

There has been a great deal of misunderstanding and wrong interpretation of proven reserves, some of it innocent, some of it malicious. At times the figures have been called wild guesses, fabrications to serve a biased purpose, and "finding oil with a pencil". Here are some thumbnail facts about proven reserves:

- Methods of estimating reserves have been perfected to within a small margin of error, so published figures can be accepted as accurate for practical purposes. The estimates recently issued by the American Petroleum Institute and the American Gas Association coincide very closely, in all essential respects, with those made by The Oil and Gas Journal in January.
- Last year the petroleum industry in the United States found two barrels of crude oil for every barrel produced, and found two cubic feet of natural gas for each cubic foot brought to the surface. This gives the lie to the popular fallacy that "we're running out of oil".
- The more oil and gas the country needs, the more the industry finds. With production at the highest levels in history, the rate of discovery and the size of the reserves went up. We aren't even tapering off in places to look for oil.
- Not all the increase in reserves came from discovery of entirely new fields. Much of it came through better knowledge of the size and nature of discoveries of earlier years and through the adoption of better methods of production. This demonstrates that the industry's steady increase in scientific knowledge and improved technology assures greater ultimate recovery from each discovery.
- The upward revisions in estimates of reserves of older fields are not optimistic juggling of figures but proof that the industry's figures are conservative and reliable. This is further demonstrated by the fact that over the years these estimates have never turned out to have been inflated.
- Proven reserves are in no sense a measure of all the oil and gas remaining in the earth. The word "proven" means that these reserves are positively known to exist at definite places and are an inventory of material available for use over a relatively short span of years.
- The fact that reserves go up during periods of high consumption and high activity in the industry demonstrates clearly that the industry will keep on supplying plenty of oil and gas as long as it has the economic incentives to hunt for them and produce them.

THIS WEEK

PETROLEUM BYPRODUCT.—This started out as a shot-hole by a Cities Service Co. exploration party near Clive, Alta., but wound up as a farmer's water supply. The shot brought a strong flow of artesian water, which immediately froze in Canada's below-zero weather. Warren Gunn, party chief, examines the phenomenon, which soon thawed out and permitted operators to case the hole and provide the landowner with an artesian water well.

INTERNATIONAL—Hard-pressed Ultramar sells all of its assets to Argentine Government for $9,000,000. . . . Move followed shutdown of its refinery forced by government refusal to permit crude-oil imports. . . . Sale made after company decided to sell facilities for scrap rather than try to remain in business in Argentina, even though government had offered concessions in regulations. . . . ¶First oil discovery in Denmark indicated in wildcat just north of German border. . . . Good shows found in 100-ft. section at about 10,000 ft. . . . ¶Socony-Vacuum finds new field in Venezuela. . . . Drill-stem test in Anzoategui wildcat produces at rate of 400 bbl. daily. . . .

EXPLORATION—Actual drilling will provide more of the geologist's information in the future, Frank Morgan believes. . . . Increased costs will require entirely new concept of exploration's share of the budget, but will be recognized as essential. . . . ¶Eugene Holman advises exploration men not to worry about running out of resources. . . . Technological advances eventually may make the earth, its oceans, and the atmosphere direct sources of materials for all of civilization's requirements.

PRICES—Union petitions OPS for average 60-cent per barrel increase in price of California crude. . . . Alleging that large-scale imports of crude to West Coast are not feasible, company says only way to meet rapid increase in demand is to increase reserves by providing adequate price incentive for more drilling. . . . ¶OPS brushes off efforts of Independent Petroleum Association of America to obtain crude - price increase. . . . Agency claims trade associations haven't the authoritity to ask for price relief, also that protest was not filed before deadline. . . .

PIPE LINE—West Texas Gulf awards contract to Anderson Bros. for construction of 60-mile segment of 26-in. Colorado City-Sour Lake crude line between Colorado City and Abilene. . . . ¶Gulf - Michigan abandons plans for $85,000,000 gas line from Monroe, La., to Michigan City, Ind. . . . Company withdrew FPC application because of difficulty in lining up sufficient reserves. . . . ¶South Georgia Natural asks FPC approval of 339-mile system in Alabama, northern Florida, and southwestern Georgia. . . .

NATURAL GAS—Higher rates needed by gas industry for efficient public service, New England association told. . . . Rising costs have cut profits to point of no return for many companies. . . . ¶PAD committee to investigate possibility of relaxing its order restricting expansion of gas facilities in areas of possible shortages. . . . Improved conditions due to slowing of defense program and expansion of underground-storage systems cited. . . .

ACTIVITY—Production of crude and lease condensate averaged 6,437,275 bbl. daily for week ended March 22, up 25,175 bbl. daily. . . . ¶Total completions for the week were up 28 wells to 843. . . . ¶Wildcat completions totaled 188 compared with 137 for previous week and 163 for same week last year. . . . ¶Rotary rigs operating in United States on March 24, reported at 2,722, represented a gain of 9 rigs over previous week. . . .

TRENDS—Stocks of four major products are 9,264,000 bbl. greater than last year. . . . The gain for District 2 amounts to 11,033,000 bbl. . . . Reduced movement to East Coast resulted in an increase of 8,423,000 bbl. for District 3. . . . District 1 stocks are up only 634,000 bbl. . . . West Coast inventories are down 11,236,000 bbl. . . .

DRILLING—First important deep production in Delaware basin of West Texas and New Mexico found by M. A. Grisham and associates. . . . Wildcat gets flow of 40,000,000 cu. ft. of gas per day upon penetrating Devonian. . . . ¶NPA lifts restrictions on use of quebracho in drilling. . . . Year-old order limited use to 60 per cent of base-period consumption to permit stockpiling. . . . NPA says action taken because substitutes proved inadequate and insufficient in quantity. . . .

More Strat Tests Seen

Morgan thinks high-cost, actual drilling operations will constitute the chief tool of the geologist of the future

Philip C. Ingalls

LOS ANGELES.—In years to come, the geologist is going to be given more and more rigs to use for the sole purpose of learning more about subsurface geology.

However, drilling costs being what they are, the geologists first are going to have to sell management on the idea that this extra drilling is necessary for integration with geophysical work and other exploration operations.

F. A. MORGAN

Resulting higher costs will force companies to take another look at the part of the budget allotted to exploration.

This is the opinion of Frank Morgan, retiring president of the American Association of Petroleum Geologists, as expressed here last week before the joint session of the Society of Exploration Geophysicists, the Society of Economic Paleontologists and Mineralogists, and the A.A.P.G.

Oil exploration and development in the future also will undoubtedly involve new techniques, Morgan said. Some of these are known now but have not been extensively tried. Others will emerge from necessity, planned research, or just plain evolution and accident.

"It is no more difficult to predict a future in oil exploration now and what to do about it and how to do it than it was in the early 1920's. The job is just bigger now—in volume and responsibility," Morgan said.

Oil plentiful.—Referring to availability of oil, Morgan said that he could not see why the oil-shortage bogey is brought up so often by thinking people.

"I can see less reason why these pessimistic statements should be given weight now than in the many, many times in the past. They have always been wrong for the reason that they have failed to give due weight to enterprise, determination, responsibility, and an ever-increasing technology."

It is highly unlikely, he said, that the industry will give up looking for oil in the ground as long as synthetic-liquid fuels are so much more costly than petroleum products.

Government influence.—Though A.A.P.G. is strictly nonpolitical, Morgan said, it isn't possible to adequately discuss oil-finding without mentioning the federal Government.

Currently, the Government is exploring for oil, drilling for oil, reserving oil, determining leasing policies, fixing land titles, promoting synthetic substitutes to compete with oil, and maintaining economic and other controls upon its competitors in private industry.

Geologists studying everything which possibly could have a bearing on the finding of undiscovered reserves of oil are having to contend with those who are attempting to lay down the rules, who give little thought to the nature of the job, the importance of the results, or the corresponding responsibility, he said.

They also have to counter those who do nothing toward improving the economics which would make the job run more smoothly and who start searching at the first turn for some easy substitute for oil which would eliminate the incentive, the risk, and the competition.

Objective.—The primary object of the A.A.P.G. as stated in its constitution is "to promote the science of geology, especially as it relates to petroleum and natural gas."

Further objectives are "to promote the technology of petroleum and natural gas and to encourage improvements in the methods of exploring for and exploiting these substances; to foster the spirit of scientific research amongst its members; to disseminate facts relating to the geology and technology of petroleum and natural gas."

To Morgan all this boils down to "oil-finding." This object of the association is what makes the association possible: "it is an endless circle, well balanced, kept vibrant and moving and growing because of results. When production fails no amount of synthetic planning will keep it alive unless the planning be for the return of production."

M. J. DAVIS

J. G. BARTRAM

K. K. LANDES

R. H. DOTT

Davis to Head A.A.P.G.

LOS ANGELES.—Morgan J. Davis, vice president and director in charge of exploration of Humble Oil & Refining Co., Houston, was elected 1952-53 president of the American Association of Petroleum Geologists here last week.

A.A.P.G.'s new vice president is John G. Bartram, consulting geologist for Stanolind Oil & Refining Co., Tulsa.

Reelected to association posts were Robert H. Dott, secretary treasurer, and Kenneth K. Landes, editor of the organization's monthly bulletin. Dott is director of the Oklahoma Geological Survey, Norman, Okla. Landes is with the geology department of the University of Michigan.

Resources Unlimited

Entire globe may be usable, Holman informs geologists

LOS ANGELES.—A concept of unlimited raw materials was described here last week by Eugene Holman, president of Standard Oil Co. (N.J.), before the joint meeting of the American Association of Petroleum Geologists, the Society of Exploration Geophysicists, and the Society of Economic Paleontologists and Mineralogists.

"It is not inconceivable," Holman said, "that the entire globe—earth, ocean, and air—represents raw material for mankind to utilize with more and more ingenuity and skill."

Chiding those who visualize the nation's resources as "stacks of raw material piled up in a storehouse" and assume that the faster the materials are used, the faster they are gone, Holman said this view does not correspond to reality.

"The fact seems to be that the first store house in which man found himself was only one of a series," Holman said. "As he used up what was piled in that first room, he found he could fashion a key to open a door into

a much larger room. And as he used the contents of this larger room, he discovered there was another room beyond, larger still.

"The room in which we stand at the middle of the twentieth century is so vast that its walls are beyond sight. Yet, it is probably still quite near the beginning of the whole series of storehouses," the Jersey Standard president said.

2,500 present.—The event at which Holman spoke was the thirty-seventh annual meeting of the A.A.P.G., the twenty-second annual meeting of the S.E.G., and the twenty-sixth annual meeting of the S.E.P.M. About 2,500 geologists were registered for the joint meeting.

March 25 was "joint session" day and featured, besides Holman's talk, addresses by the retiring presidents of the three societies, Frank Morgan of A.A.P.G., Sigmund Hammer of S.E.G., and T. H. Philpott of S.E.P.M.

The papers of Hammer and Philpott were published in the March 24 issue of the Journal. A report on Morgan's talk appears in this issue. The joint session also heard F. H. Lahee's report on exploratory drilling in 1951, which will appear in the April 7 issue of the Journal.

Awards Presented

Heald receives Sidney Powers Memorial Medal; Eckhardt, Siever, Twenhofel, Faust honored by technical societies

LOS ANGELES.—K. C. Heald, vice president of Gulf Oil Corp., Pittsburgh, was awarded the Sidney Powers Memorial Medal for 1952 here last week by the American Association of Petroleum Geologists.

R. SIEVER

The gold medal, highest honor awarded in petroleum geology, went to Heald for his "long and outstanding service and contributions in petroleum geology and for his leadership in research bearing on the important problem of the origin of oil." It was conferred during the annual presentation of honors at the joint session of the Society of Exploration Geophysicists, the Society of Economic Paleontologists and Mineralogists, and the A.A.P.G.

Heald is a charter member of A.A.P.G., served as editor of its monthly publication for 31 years, and was the association's fourteenth president.

Only five other petroleum geologists have received the medal. They are: Wallace E. Pratt, 1945; Alexander Deussen, 1947; A. I. Levorsen, 1948; E. DeGolyer, 1950; and Max Steineke, 1951.

President's award.—Winner of the 1952 President's Award of the A.A.P.G. was Raymond Siever, associate geologist in the Coal Division of the Illinois State Geological Survey, Urbana.

K. C. HEALD

The award is made annually to the author, under 35 years of age, of the most significant original contribution to petroleum geology published in the monthly bulletin of the association during the previous year.

Siever's winning paper is entitled "Mississippian-Pennsylvanian Unconformity in Illinois." The paper is part of Sievers dissertation submitted to the University of Chicago in partial fulfillment of the requirements for the Ph.D. degree in geology, conferred in 1950.

E. A. ECKHARDT

L. Y. FAUST

Eckhardt honored.—E. A. Eckhardt, vice president of Gulf Research & Development Co., Pittsburgh, was awarded honorary membership in the S.E.G.

In presenting the honor, Sigmund Hammer, retiring president, said "The award is made in official and public recognition of the society's debt to you for your outstanding interest in its affairs since its inception, for your contributions to the development and improvement of several important geophysical exploration techniques, for your administrative genius in developing men, and for your effective leadership in promoting wholesome cooperation between geologists and geophysicists."

Eckhardt is a past president of the S.E.G. and has served since 1947 as chairman of its committee on geophysical activity *(The 1951 report of the committee was published in the March 24 issue of the Journal)*.

S.E.G. best paper.—S.E.G.'s fourth annual best-paper award was presented to L. Y. Faust, geophysicist with Amerada Petroleum Corp., Tulsa.

Faust's paper was "Seismic Velocity as a Function of Depth and Geologic Time," voted by the society's committee on honors and awards to be the most outstanding contribution published in geophysics during 1951.

S.E.P.M. award.—The recipient of S.E.P.M.'s award in recognition of services went to W. H. Twenhofel, professor emeritus of the University of Wisconsin.

Twenhofel is the author of many articles and books, one of the best known being his "Treatise on Sedimentation," published in 1926. He is recognized as the man largely responsible for the present prominence of the study of sediments and sedimentary rocks in the science of geology.

He was president of the S.E.P.M. in 1935 and editor of the Journal of Sedimentary Petrology from 1933 to 1951.

S.E.G. Elects Johnson

LOS ANGELES.—New president of the Society of Exploration Geologists is Curtis H. Johnson, assistant chief geophysicist for General Petroleum Corp.

Elected at the society's annual business meeting here last week, Johnson will replace Sigmund Hammer.

Roy L. Lay, manager of the geophysical division of The Texas Co., Houston, was elected vice president, and Carl L. Bryan, consulting geo-

C. H. JOHNSON

R. L. LAY

P. L. LYONS

C. L. BRYAN

physicist of Shreveport, is the new secretary treasurer.

Paul L. Lyons, last year elected editor of S.E.G.'s quarterly publication, "Geophysics," will continue in that capacity during the present fiscal year. Lyons is manager of exploration for Anchor Petroleum Co., Tulsa.

S.E.P.M. Officers Elected

LOS ANGELES.—C. C. Church, Tide Water Associated Oil Co., San Francisco, last week was elected president of the Society of Economic Paleontologists and Mineralogists for the coming year.

C. C. CHURCH

New vice president of the society is Morton B. Stephenson, Stanolind Oil & Gas Co., Houston.

Cecil G. Lalicker, geology department of the University of Kansas, was reelected secretary-treasurer.

New officers were elected at the society's annual business meeting held here during the joint session of the S.E.P.M., the American Association of Petroleum Geologists, and the Society of Exploration Geophysicists.

M. B. STEPHENSON

C. G. LALICKER

Basin Map Available

The map of oil basins of the United States which was issued as a supplement to the geological number of The Oil and Gas Journal March 24 is now available for separate distribution.

The four-color map also shows cross-sections of the geology of the more important basins and includes a correlation of the names and ages of formations as found in various parts of the country. Copies of the map may be obtained from the Journal's Reader Service Department at $2 each.

Drilexco Acquires Texla Gas

ABILENE, Tex.—Drilling & Exploration Co., Inc., has acquired all the stock of Texla Gas Corp. and plans to liquidate the company.

Texla assets included about a 40 per cent interest in Lisbon and Northeast Lisbon gas fields in North Louisiana.

The transaction was a stock transfer in which Texla stockholders were given shares of Drilling & Exploration Co. stock. Drilling & Exploration already has producing properties in Texas, New Mexico, Oklahoma, and California and is a major drilling contractor.

Gas Firms Pinched

Stiffer taxes plus higher labor, materials, drilling, and other costs make rate boosts a necessity, N.E.G.A. told

BOSTON.—Rising costs have narrowed profits to the point of no return for many companies in the gas industry, and higher rates must be granted if the industry is to continue to serve the public efficiently, members of the New England Gas Association were told here last week.

The association was to have been addressed by George F. Mitchell, president of the American Gas Association, and head of Peoples Gas Light & Coke Co., Chicago, but Mitchell died unexpectedly a day before the meeting opened. His speech was delivered by Earl H. Eacker, vice president of A.G.A. and president of Boston Consolidated Gas Co.

The late A.G.A. president had emphasized that the industry needs financing for a $4,500,000,000 expansion program over the next 5 years, and that its credit must be maintained along with a fair rate of return to investors.

Cost factors.—Mitchell's remarks, delivered by Eacker, applied to manufactured and mixed as well as to natural gas. Data he had prepared showed utilities distributing natural gas find a major part of their increased costs in the higher well-head prices for natural gas and in the rising costs of transmission companies.

Gathering and other taxes imposed by Louisiana, Texas, Oklahoma and some other producing states on natural-gas withdrawal have added to the burden of the industry. Furthermore, increased drilling and exploration costs add to the field price of gas. All this inevitably is reflected at the distributing end.

For example, Mitchell had said, the average cost of a wildcat today is about $90,000 with a 9-to-1 chance against success and about a 40-to-1 chance against making a substantial profit on the venture. Well-head prices for gas 10 years ago averaged 4½ cents per M.c.f., but today contracts call for 12 and 13 cents, and one large producer has set 15 cents as its field price on future contracts.

The cost of constructing pipe lines has risen more than 85 per cent during the last 10 years, the A.G.A president had continued. In 1941, companies figured the average cost per mile of pipe line to be about $1,000. Today, the cost for similar lines is estimated at between $1,850 and $2,500 per mile.

Materials up too. — Among the examples of higher materials costs cited by Mitchell were: Pacific Gas & Electric Co. for whom the average price of 4½-in. pipe rose 177.5 per cent from 1940 to 1950 and the average price of tank plate was up 35.2 per cent in the same period; and Columbia Gas System, Inc., which found that it pays $123 a ton for pipe which it bought for $51 in 1940, a rise of 225 per cent.

Labor and fuels.—For the entire gas-utility industry, labor costs totaled about $249,000,000 in 1940. In 1950 the annual payroll was $622,000,000.

While natural-gas prices have advanced, the higher cost of this fuel to the distributing companies has been paralleled by increases in the price of solid fuel and oil used in the manufactured-gas production.

Solid-fuel costs to gas utilities went up from $6.90 a ton in 1945 to $10.80 a ton at the end of 1950 Oil which cost the utilities 4½ cents in 1945 was up to 8½ cents in 1948. In 1950, the average price was down to 6 cents, partly because of a new gas-making process developed under A.G.A. auspices and enabling the use of low-cost bunker fuel in making gas. However, Mitchell had said, some gas utilities pay as much as 13 cents for superior grades of fuel oil for gas making.

Against these greatly increased costs, the regulated rates of the gas industry have shown only minor increases. While the cost-of-living index in the United States stood at 189.1 per cent of the 1935-39 average at the end of 1951, the average cost of residential gas service on the same date was only 103 per cent of the 1935-39 average.

TYPICAL PUMP STATION.—One of the 19 microwave stations on Humble's 400-mile line is this one at the Warda pumping station in Lee County, Texas.

New Microwave System

Humble Pipeline begins operation of 400-mile radio-relay system on route of West Texas-to-Houston crude-oil line

F. Lawrence Resen

HOUSTON.—Humble Pipeline Co.'s new 400-mile microwave system has been placed in operation on its crude-oil-line route between Kemper station, near Big Lake, West Texas, and the Houston office.

The radio-relay system consists of 19 microwave stations, including 18 along the pipe-line route and one at the company's headquarters building in downtown Houston.

In addition to serving the pumping stations, receiving and transmitting equipment has also been installed to serve the Katy cycling plant of Humble Oil & Refining Co.

Pumping stations along the line's route are located at Fort McKavett, in Menard County; Eckert, in Gillespie County; and Warda, near Giddings, in Lee County. The line terminates at Satsuma, in Harris County, near Houston. The microwave towers range in height from 80 to 280 ft.

Standby power.—Each of the microwave stations is equipped with automatic standby power systems which will supply electricity in emergencies. Generators will automatically shut off when normal power is resumed.

To make remote supervision of the system practical, electronic equipment was installed to detect any difficulties along the route. By a series of tests, the Houston wire chief can determine if any equipment has failed at any repeater station, if standby generators are running, or if airplane warning lights are operating.

Twenty-four telephone channels may be employed for messages, although immediate plans call for utilization of only eight. Two "drop-out" circuits at various stations will be available, one to be used for telephone service and the other for telemetering and supervisory control.

Since the microwave beam, transmitted in the 6,000-7,000 meg. band, travels in a straight line, it may be refracted due to stratified layers of air at varying temperatures. Such phenomena required that the towers be located so as to take advantage of terrain for achieving greater line-of-sight distance and to avoid having signals affected by natural or man-made obstructions.

WHERE IT STARTS.—This equipment enables the Kemper, West Texas, operator to maintain telephonic contact with the home office in Houston, as well as all other stations on the pipe line.

Industry Briefs

NEW YORK.—Socony-Vacuum Oil Co., Inc., had a record net production of 76,000,000 bbl. of crude oil in the United States last year, the company revealed here. With an average of 209,000 bbl. daily, the total exceeded that of 1950 by 15 per cent, and, despite withdrawals, the company increased its domestic estimated proven reserves of crude and condensates by 159,000,000 bbl. to a total at year's end of 1,650,000,000 bbl.

DENVER.—Victor Ziegler, former owner of Bonanza Oil Co., has organized Ziegler Exploration Co., a $5,000,000 oil enterprise with headquarters in this city. The new company will operate in Montana, Texas, and Wyoming, Ziegler said. Sale of Bonanza was reported to have been negotiated for about $3,000,000.

TULSA.—The Petroleum Industry Electrical Association and the Petroleum Electric Supply Association have nearly completed plans for their twenty-fourth annual meeting here April 14-17. The associations look for about 700 electrical-communications men in the oil industry to attend the 4-day program which will be held in the Mayo Hotel and Cimarron Ballroom.

EL DORADO, Ark.—A new firm. Amurex Development Co., has been organized to prospect for oil and gas in western Canada. Organized by Murphy Corp., El Dorado, and Ashland Oil & Refining Co., Ashland, Ky., the company will be headed by C. H. Murphy, Jr., president. Paul B. G. Blazer, Ashland, has been named chairman of the board.

CALGARY, Alta. — Campbell Absorption Plant, Ltd., has revealed that it will build a natural-gasoline plant in the South Leduc-New Norway area of Alberta. The firm said it contemplates serving an area south of the line between Townships 49 and 50. Products will be natural gasoline, butane, and propane.

SAN ANTONIO. — Jergins Oil Co. of Texas has changed its name to Monterey Oil Co. of Texas. Jerome J. O'Brien, vice president and general manager, said the move involves no change in the business or operations of the company. The firm is active principally in Southwest Texas, with production in Helen Gohlke and South Coletto Creek fields and the Cologne area of Victoria County and the McKee area of Crane County.

OTTAWA.—An official of the Canadian Board of Transport Commissioners said here that Champion Pipe Line Corp. has withdrawn its application to build a crude-oil pipe line from fields in Alberta to Vancouver, B. C. The move was presumed due to the granting of a franchise for a similar line to Trans Mountain Pipe Line Co. Champion's proposed line would have followed a southerly route via Crow's Nest Pass. Two other competing firms dropped applications earlier this year.

SOUTHWEST

Delaware Basin Strike

Gasser blows in on western flank, giving area its first significant deep production; more deep drilling expected

Roy F. Carlson

MIDLAND, Tex.—The first significant deep production of hydrocarbons in the Delaware basin has blown in.

Although the well has indicated only gas production at the present time, it has set off a flurry of lease buying and trading activity that may presage an intense drilling campaign. The basin is nearly all leased now.

Early reports had the well, M. A. Grisham et al 1 Grisham, just beginning to penetrate the Devonian section at a depth of about 9,000 ft. when a drill-stem test showed an indicated gas production of 40,000,000 cu. ft. daily.

Flowing pressure during the test ranged from 1,275 to 1,550 psi. maximum, and shut-in bottom-hole pressure was 4,355 psi. in 22 minutes. This flow was through a ⅝-in. bottom-hole choke and a 2-in. opening at the top. No liquid was recovered.

Later when the drilling crew was returning to bottom with a bit to drill the well deeper before testing again, the well blew all mud out of the hole when the drill pipe was still 100 ft. off bottom. Since then the well has been making an estimated 60,000,000 cu. ft. per day through a bleed line.

Operator was to kill the well with new heavier mud and again test after more footage is made. A string of casing will probably be run before drilling deeper, however.

NEW DEEP PRODUCTION.—Leasing play was set off by the 1 Grisham with the discovery of gas at 9,000 ft. on the western edge of the Delaware basin.

On western flank.—This well is located on the western flank of the Delaware basin, 30 miles from Toyah, Culberson County, Texas.

In only one other deep well in the Delaware basin have any quantities of hydrocarbons been recovered, and that was in a now-abandoned well of Argo Oil Corp. in the southern end of the basin.

Thorough completion efforts and offset holes failed to develop commercial production. The well did produce some oil, however, from the Wolfcamp horizon at about 10,000 ft.

The basin is virtually untouched by the drill in its deeper horizons. Several Delaware sand wells have been drilled, and a few small fields have been discovered. However, it remains for much more intensive drilling to discover any large deep fields.

The problem of locating a well is made extremely difficult because of insufficient subsurface geologic information. Seismic work, although recently intensified, is extremely difficult.

Deep drilling scattered.—In all, there are fewer than a dozen wells that have penetrated below the Delaware formation of Permian age. Of these, only six have gone to the Ellenburger or its equivalent. Since the basin has an area of over 6,000,000 acres, the deep wells have necessarily been widely scattered.

Although this latest Delaware basin discovery is currently producing only gas, it has done much to support the interest that has been given it in the past by many West Texas operators and will probably lead to more deep drilling.

Since the basin is lithologically similar to the Midland basin, though deeper, it is expected to produce large quantities of oil in the future.

Pipe-Line Contract Let

HOUSTON.—Anderson Bros. Corp., Houston, has been awarded another contract for construction of a portion of West Texas Gulf Pipeline Co.'s crude-oil line from Colorado City to Sour Lake, Tex.

The new contract is for 60 miles of 26-in. line starting at the Colorado City terminus, and proceeding eastward to join at Abilene the 120-mile spread previously contracted to Associated Pipe Line Contractors, Inc., Houston.

Previously, Anderson Bros. had been awarded two spreads, totaling 94 miles, on the east side of Associated's 120-mile segment. Contracts have now been let for almost two-thirds (58 per cent) of West Texas Gulf's projected 471-mile line, including all that portion from Colorado City to Wortham. Still to be contracted is the 197-mile segment from Wortham to Sour Lake, and the 114-mile lateral from Wortham to Longview.

While West Texas Gulf officials do not expect final completion of the pipe line before early fall, it has been learned that the first two contracts awarded to Anderson Bros. (between Granbury and Wortham, Tex.), have already been completed and that Associated's project will in all probability be completed by May 1.

Anderson Bros. new spread office has been located at Sweetwater, and Gene Coulter is the spread superintendent. Construction will commence immediately.

Expansion Approved

Accelerated amortization granted 58 petroleum projects by DPA; new facilities to cost more than $79,500,000

WASHINGTON. — Certificates for accelerated amortization of 58 expansion projects in the oil and gas industry with an estimated cost in excess of $79,500,000 were granted by the Defense Production Administration during the last 2 weeks of February.

A summary of DPA certifications shows that the largest projects were for investments of $12,375,000 for production of alkylation feed stock at Lima, Ohio, for which Standard Oil Co. (Ohio) was granted 65 per cent on $7,987,000 and 40 per cent on $4,388,000; and $8,385,405 for natural gas and butane in Midland and Upton counties, Texas, for which Magnolia Petroleum Co. was given 65 per cent on $7,086,211, 40 per cent on $1,237,329, and 25 per cent on $26,865.

A total of $6,719,000 was approved for gasoline and alkylation feed stock at Cleveland for which Standard Oil Co. (Ohio) was given 65 per cent on $1,787,600, 45 per cent on $1,744,400, and 25 per cent on $3,187,000; and $5,446,400 for propane, mixed butanes, and pentanes in Ector County, Texas, for which Phillips Petroleum Co. was given 65 per cent on $3,765,800 and 40 per cent on $1,680,600.

These were the top 4 of 33 production projects aggregating more than $58,000,000, for which accelerated amortization was granted as follows:

Ashland Oil & Refining Co., $1,190,000 for gasoline at Louisville, Ky., 65 per cent on $585,000 and 45 per cent on $605,000; Phillips Petroleum Co., $1,500,000 for refining at Great Falls, Mont., 65 per cent on $1,135,000 and 45 per cent on $365,000; and Hugoton Production Co., $300,000 for butane and propane at Ulysses, Kans., 65 per cent on $280,403.

Lubrizol Corp., $887,131 for chemical additives at Wickliffe, Ohio, 65 per cent on $247,511, 45 per cent on $196,362, and 15 per cent on $325,403; Shell Oil Co., New York, $812,000 for natural gas, 65 per cent; L. Sonneborn Sons, $750,000 for petroleum sulfonates at Petrolia, Pa., 65 per cent on $349,000, 50 per cent on $273,000, and 15 per cent on $128,000; and Morton-Withers Chemical Co., $1,780,742 for petroleum sulfonates at Greensboro, N. C., 65 per cent on $1,236,428, 45 per cent on $353,314, and 15 per cent on $186,000.

Panhandle Eastern Pipe Line Co., $510,000 for isobutane and propane at Kansas City, Mo., 55 per cent; Stanolind Oil & Gas Co., Tulsa, $286,000 for isobutane in Grant County, Kansas, 90 per cent; Hugoton Production Co., $205,000 for natural gas at Garden City, Kans., 40 per cent; and Texas City Refining Co., $2,500,000 for aviation alkylate at Texas City, Tex., 50 per cent on $2,480,000.

Pan-Am Southern Corp., $250,000 for polybutylene at El Dorado, Ark., 65 per cent on $215,000; Cities Service Oil Co., $231,267 for gasoline at Pampa, Tex., 65 per cent on $222,139; Esso Standard Oil Co., $477,000 for octyl alcohol at Baton Rouge, La., 70 per cent on $326,000.

Sinclair Refining Co., 175 for barium sulfonate at Houston, Tex., 65 per cent on $98,650, 50 per cent on $23,700, and 15 per cent on $23,480; and Warren Petroleum Corp., $644,340 for propane and butane at Tulsa, 65 per cent on $566,320.

Lubrizol Corp., $2,044,139 for chemical additives at Deer Park, Tex., 65 per cent on $444,437, 45 per cent on $548,637, and 15 per cent on $655,807; Phillips Petroleum Co., $1,899,700 for cyclohexane at Borger, Tex., 90 per cent on $1,230,990, and 45 per cent on $325,090; Phillips Petroleum Co., $2,165,055 for propane and isobutane at Borger, Tex., 65 per cent on $1,852,050, 40 per cent on $111,418, and 15 per cent on $19,190; and Del Rey Petroleum Co., $371,422 for natural gasoline, butanes, and propanes at Eagle Lake, Tex., 65 per cent on $364,009 and 15 per cent on $7,413.

Graver Tank & Manufacturing Co., Tulsa, $46,200 for oil-field machinery at Sand Springs, Okla., 50 per cent; Stanolind Oil & Gas Co., Tulsa, $3,163,600 for natural gas in Andrews County, Texas, 65 per cent on $2,338,853 and 40 per cent on $445,706; Shell Oil Co., $86,500 for hydrogen sulfide at Deer Park, Tex., 70 per cent; and Shell Oil Co., $1,000,000 for aviation-gasoline components at Deer Park, Tex., 90 per cent.

Union Oil Co. of California, $750,000 for ammonium sulfate, fuel oil, and elemental sulfur at Wilmington, Calif., 70 per cent on $679,200 and 45 per cent on $70,800; and Union Oil Co. of California, $450,000 for elemental sulfur at Wilmington, Calif., 70 per cent on $416,000 and 45 per cent on $34,000.

Standard Oil Co. of California, $1,050,000 for lubricating-type oils at

Mid-Continent A.P.I. Officers

G. C. MacDonald, division drilling engineer of Gulf Oil Corp.'s Tulsa production division, is congratulated by Harold E. Berg, Tide Water Associated Oil Co., Tulsa, upon his election as chairman of the Mid-Continent district of the American Petroleum Institute's Division of Production. Berg is retiring chairman. New officers were elected at the district's annual meeting in Wichita March 19-21. Left to right are A. H. Massad, Magnolia Petroleum Co., Drumright, new vice chairman for northeastern Oklahoma; Jack L. Worley, Independent Oil & Gas Service, Wichita, vice chairman for eastern Kansas; S. K. Myers, Atlantic Refining Co., Great Bend, Kans., vice chairman for western Kansas; MacDonald; H. M. Cooley, Bethlehem Supply Co., Tulsa, secretary-treasurer; and Berg. Not shown are Fred Neslage, West Pampa Repressure Association, Pampa, vice chairman of North Texas, and Berdun Leonard, Magnolia Petroleum Co., Duncan, vice chairman for southwest Oklahoma.

WATCHING WASHINGTON

Bertram F. Linz

NATO Oil Discussions

Supply officers and oil experts of the North Atlantic Treaty Organization (NATO) will meet in London this week to discuss the supply-and-demand problems in military oil products with a possibility that some consideration may be given to a standardization of the specifications of the participating countries.

Whether anything would come of such discussions is a question, in view of the inability to agree upon a standard rifle last year, but government oil men in Washington, at least, believe such a move would be highly advantageous.

Standard specifications applicable in all NATO countries would have obvious advantages in the event of war. The idea, if presented in London, will probably receive at least tacit approval from the British in view of the fact that during the last war, when the United States was oiling all the allies, no difficulty was encountered in accommodating foreign ships, tanks, and other equipment to American products.

The NATO oil discussions will cover the whole field of supply and demand. In addition to the military, the meetings will be attended by representatives of the State Department, Mutual Security Agency, and Petroleum Administration for Defense. PAD representatives will be C. Stribling Snodgrass, assistant deputy administrator for foreign operations, and Cecil L. Burrill, director of the program division.

The Elk Hills Question

Munitions Board officials are considering the suggestion of the Petroleum Administration for Defense that crude production in the Elk Hills naval petroleum reserve be stepped up, both to help remedy a shortage of crude on the West Coast and to permit a "shakedown" test of the capabilities of the field in the event of war.

There is little or no likelihood, however, that anything will come of the proposal this year.

It would require adoption of a joint resolution of Congress to open up the field. To secure such legislation the military would have to take the position that there is a shortage of oil, which it could not and would not do.

Had the military suggested stepping up production a year ago as insurance against a possible shortage as well as a test of the field it probably could have secured congressional approval, but the sense of urgency which then prevailed has now been dissipated.

PAD officials anticipate no trouble in product supply before the fourth quarter of this year, when the residual situation is likely to tighten up. If the winter is cold, new shortages of heating oils are likely to develop on the East Coast even though higher price ceilings may be authorized next month by the Office of Price Stabilization.

Such shortages, it is pointed out, would be due to inadequate transportation because of the transfer to foreign service of many tankers which formerly supplied the East Coast area.

Dragging its Heels

Although committees on both sides of the Capitol are working vigorously in many fields of legislation, Congress is dragging its heels and it has become definitely apparent that it intends to pass few bills other than those providing appropriations for operation of the government, extension of the Defense Production Act, and provision of foreign aid.

The tidelands bill is one of the few measures that will be of sufficient urgency to secure consideration during the session. This will be largely because the long-drawn-out fight over the oil resources of the submerged lands has become a definite issue and test of strength between the administration and its opponents.

Congressional leaders are aiming at adjournment in July, before the party conventions if possible, but even with the skeletonized schedule they are working up, they may find this impossible unless the appropriation bills are speeded up. It takes a dozen or more separate measures to finance the government agencies, and so far the House has acted on only four and the Senate on none.

With the Democrats at war among themselves and the Republicans fanning the fire by frequently joining the Southerners opposed to the administration, there is little chance that President Truman will get any legislation on matters of less than vital importance.

Richmond, Calif., 65 per cent on $950,700, 40 per cent on $50,500 and 15 per cent on $48,800; Shell Oil Co., $476,000 for sulfonates at Martinez, Calif., 65 per cent on $414,000, and 40 per cent on $62,000; and Union Oil Co. of California, $84,780 for motor gasoline and diesel fuel at Oleum, Calif., 65 per cent.

Certificates for transportation projects included the following:

Republic Tank Car Co., New Hyde Park, Long Island, N. Y., $1,100,000 for tank-car transportation, 70 per cent; New York Transit Co., Olean, N. Y., $125,400 for pipe line, 35 per cent on $117,400; The Texas Co., $558,660 for pipe line, 25 per cent; and The Texas Co., $426,000 for pipe lines at Greensboro, N. C., 40 per cent.

Shell Oil Co., Lima, Ohio, $140,800 for pipe line, 15 per cent; Ashland Oil & Refining Co., $2,357,750 for pipe-line transportation, 40 per cent on $668,000 and 25 per cent on $1,232,950; Inland Corp., Cleveland, $965,000 for pipe line, 25 per cent; and Buckeye Pipe Line Co., Carleton, Mich., $175,000 for pipe-line transportation, 25 per cent on $156,000.

Miami Valley Corp., Cleveland, $1,600,000 for pipe-line transportation, 25 per cent; Interstate Oil Pipe Line Co., Valentine Anchorage, La., $681,003 for transportation, 25 per cent on $676,213; Phillips Pipe Line Co., Bartlesville, Okla., $1,255,300 for crude-oil pipe line, 25 per cent on $992,573; and Texas Pipe Line Co., Houston, $1,232,265 for pipe-line transportation, 25 per cent.

Salt Lake Pipe Line Co., Salt Lake City, Utah, $778,000 for pipe-line transportation, 25 per cent on $768,196; Central Arizona Light & Power Co., Field, Ariz., $240,000 for natural-gas pipe line, 50 per cent; and Interstate Oil Pipe Line Co., Shreveport, La., $2,105,694 for crude oil, 25 per cent on $1,067,351, and 20 per cent on $820,768.

The following storage projects also were approved by DPA for 40 per cent of investment except where otherwise specified:

Pure Oil Co., $213,680 at Norfolk, Va.; Esso Standard Oil Co., $2,508,800 at New Haven, Conn.; Hess, Inc., $721,801 at Perth Amboy, N. J. ($505,700 approved); Sinclair Refining Co., New York, $556,000 ($438,500 approved); Gulf Oil Corp., Pittsburgh, $847,295 ($835,196 approved); Atlantic Refining Co. $380,000 at Savannah, Ga. ($337,895 approved); Sinclair Refining Co., $165,000 at Memphis, Tenn., and Warren Petroleum Corp., $364,346 for storage reservoirs for petroleum gas near Hattiesburg, Miss. ($352,546 approved).

Sinclair Refining Co., $155,000 at Nashville, Tenn.; $569,000 at Indianapolis and $171,500 at Dubuque, Iowa; Standard Oil Co. of California, $1,800,000 at San Francisco ($834,800 approved), and $167,100 at Fairbanks, Alaska, ($153,000 approved).

Safe Place to Work

Oil-industry workers are safer on jobs than at home and no federal safety laws are needed, Senate committee told

WASHINGTON.—Workers in the petroleum industry are safer on their jobs than in their homes, a Senate labor subcommittee was told last week by Frank Sluze, director of safety for Ashland Oil & Refining Co.

Testifying as spokesman for the National Petroleum Association in opposition to pending legislation to establish federal standards for industrial safety, Sluze cited statistics to show that workers are 30 per cent safer on their jobs than in their homes.

The oil industry has been engaged vigorously in safety work for many years, Sluze said, and in new refinery construction and expansion this year will spend close to $40,000,000 on safety equipment. The companies in the industry, he added, spend approximately $3,500,000 a year for the employment of fire and accident-prevention experts.

Through this work the number of workers to each fatality in the industry has been increased to 5,900 in 1950 from 2,922 in 1945, the frequency (accidents per million hours) rate was 30 per cent better than in 1934, and the severity rate (days lost per thousand hours) was 51 per cent better.

Good record.—The industry's record of fire prevention is three times as good as the nation-wide record in spite of the fact that it handles highly flammable materials at high temperatures and high pressures. The 1950 average loss for oil companies was only 10 cents per $100 property value against a national average of 27 cents.

Sluze told the subcommittee that the proposed legislation would merely increase the financial burden of the federal Government and the taxpayers without no assurance of better conditions than those achieved by industry.

It would tend to remove the spirit of incentive that has sparked the fire and accident-preventive activities of the oil companies. Further, he charged, the intervention of Government in this field could result in the making of decisions or regulations inimical to the financial stability of oil companies.

Outstanding job.—"The petroleum industry has done an outstanding job of preventing fires and accidents and in providing safety equipment and clothing for workers in hazardous areas," Sluze said.

"A continuation of the constantly improving safety record of the industry can be expected through a continuation of the existing recognition of the soundness, both economically and socially, of working conditions and the individual and cooperative voluntary efforts toward achieving better and safer working conditions. That the petroleum industry has the organization, knowledge, and techniques to accomplish better what these bills are designed to do is made clear by the account of what it is doing and will continue to do to save lives and property."

The legislation, sponsored in differing forms by Sen. James E. Murray of Montana and Sen. Hubert H. Humphrey of Minnesota, would establish federal safety standards and inspection for all industry. It is an expansion of a move to enact safety laws for the coal-mining industry resulting from recent serious mine accidents.

Quebracho Freed

NPA lifts ban, saying no adequate substitute found

WASHINGTON. — Restrictions on use of quebracho in drilling have been lifted by the National Production Authority because of the lack of adequate substitutes.

The order, issued April 1, 1951, to permit the stockpiling of quebracho, highly important and indispensable in the tanning of leather, limited its use in oil-well drilling to 60 per cent of base-period consumption.

At that time it was represented that substitutes suitable for use in drilling operations were being developed and would adequately supplement the reduced supply of quebracho, but this turned out not to be the case.

"NPA decided to remove the percentage restriction on the drilling industry's use of quebracho after the industry and the Petroleum Administration for Defense established the fact that quebracho substitutes are not adequate for drilling in all types of formations and also are insufficient in quantity," it was explained.

Follows NPC report.—The action in lifting quebracho restrictions came only a few months after the National Petroleum Council made its detailed report on quebracho requirements, urging that the restrictions, as far as the oil and gas industries were concerned, be ended.

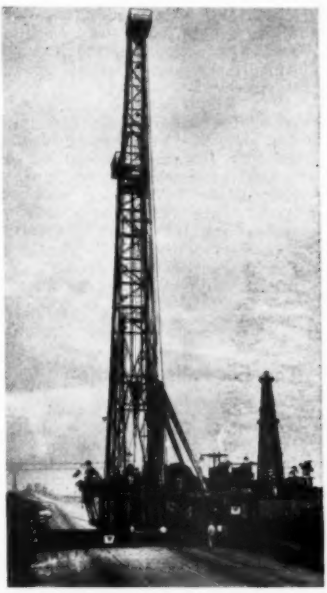
NPC's study committee, headed by John R. Suman of Standard Oil Co. (N. J.), stated that in spite of the increase in the load being carried by substitutes for quebracho, demand for the ingredient had increased to 120 per cent of the 1948 level by 1951. Had it not been for utilization of tannin substitutes demand would have increased to about 170 per cent of 1948 usage.

Also, the committee said that depths of wells drilled are continually increasing, and that deeper wells require more quebracho; and that workover operations, which require use of quebracho, are increasing.

Although rapid progress had been made in utilizing substitutes, "none is a 'universal substitute' that can be used in all cases, nor can they all be used on a pound-for-pound basis as substitutes," the committee said.

Mangrove bark arriving.—Meanwhile it was revealed in Houston last week that the first substantial amounts of processed mangrove bark, to be used in drilling mud as a substitute for quebracho, are now being imported from Panama by Man Tan Chemical Co. of Dallas.

Man Tan claims the processed bark can be effectively used as a dispersant to keep heavy ingredients from settling out of the mud, which is the principal quality of quebracho.



Detour, Please

Morning rush-hour traffic was slowed considerably by this project. General Petroleum Corp. was skidding the rig into the Lomita area of Torrance field. The job of crossing the busy boulevard near Los Angeles was completed within 2 hours. Since the rig-skidding technique was developed, sights such as this have become almost commonplace in the Los Angeles area.

Steel Allotted

Oil industry given 170,000 tons more in third quarter

WASHINGTON. — Steel allocations for third-quarter delivery to the oil and gas industry will be approximately 170,000 tons greater than for the quarter just starting but nearly 400,000 tons less than the Petroleum Administration for Defense asked of the Defense Production Administration.

DPA officials said, however, that the 1,903,750 tons allowed will be adequate to carry forward the expanded petroleum program at a high level and indicated that a corresponding increase will be made in the allocation of steel for petroleum operations abroad.

The second-quarter allotment announced by DPA January 11 was 1,710,375 tons but in announcing the third-quarter figure it was disclosed the amount to be made available for the April-June period has been revised to 1,707,401 tons. PAD officials, however, figure they will get a total of 1,709,500 tons, including conversion steel.

Other metals. — In addition to the steel, DPA made allocations of 9,050,000 lb. of copper, against 8,375,000 lb. for the coming quarter, and 1,500,000 lb. of aluminum, against 1,290,000 lb., for domestic oil and gas operations.

It explained that while copper is expected to remain in tight supply and be the greatest single limiting factor on production, the supply of aluminum is estimated to be slightly more favorable.

While the steel allotment is approximately 296,000 tons greater than for the second quarter, 25,000 tons must be taken out of that increase for military storage, a new item for which the PAD is now the claimant agency.

While PAD officials were somewhat disappointed over the failure of DPA to come closer to the 2,300,000-plus tons they requested, they point out that the increased supply will permit a start on the new 18-month "80,000 wells" program.

An expansion program of this magnitude, they explained, starts relatively slowly and initially does not require a great amount of material although it was indicated, considerably more than is being provided could be used.

Availability. — Total availability of steel for the third quarter, however, may be considerably in excess of the amount allocated if operators are able to make extensive use of mechanical tubing, of which it is estimated as much as 100,000 tons a quarter might be secured.

The increased allocations and DPA's comment that it will carry the "revised petroleum expansion program" are taken as supporting reports that the 80,000-well program would receive approval from top mobilization officials.

It has been indicated, however, that formal endorsement of the program will be accompanied by a stipulation that approval does not carry with it any commitment on the part of DPA to provide the materials necessary to carry the program on.

Tubular Goods Divided

WASHINGTON.—A total of 243,155 tons of casing and tubing was divided among 138 Class B operators for the first quarter, compared with 240,217 tons allotted to 162 operators for the last quarter of 1951.

A detailed report on the distribution of the 408,710 tons available for scheduled first-quarter operations, compiled by the Petroleum Administration for Defense, shows that 514 smaller operators were successful in getting 82,002 tons of casing and tubing and 1,417 other operators were given 77,453 tons from set-aside stocks at field warehouses.

Another 6,100 tons was distributed to 54 applicants for miscellaneous wells, such as brine and sulfur, and 22,200 tons was allotted to the emergency field stocks for use in drilling wildcats.

All told, there were 3,097 applicants for casing and tubing for other than wildcat drilling, of whom 974 were turned down, 11 of them Class B operators; 2,123 were given allotments.

The largest allotments to Class B operators — those who drilled more than 40 wells in the base period— were 19,711 tons to The Texas Co., 17,495 tons to Humble Oil & Refining Co., 12,654 tons to Shell Oil Co., 12,525 tons to Stanolind Oil & Gas Co., 11,231 tons to Sun Oil Co., and 10,088 tons to Phillips Petroleum Co.

The Class B operators were allotted 57 per cent of the total tonnage and the smaller operators 43 per cent, corresponding roughly, on a tonnage basis, to the division of casing and tubing between the two groups during the base period, PAD officials said.

Products Exports Rise

WASHINGTON.—Exports of major oil products averaged 221,600 bbl. daily during the week ended February 29, increasing 94,300 bbl. daily over the average for the preceding week to reach the highest figure touched since the week ended January 18, according to preliminary figures compiled by the Petroleum Administration for Defense.

With the exception of kerosine, of which there were no exports during the week, and residual, in which a slight drop was recorded, product exports registered sharp gains.

The average daily exports for the week ended February 29, compared with the preceding week and the average for 4 weeks ended February 29, in thousands of barrels, were as follows:

	Feb. 29	Feb. 22	4 wks. ended Feb. 29
Aviation gasoline	65.3	2.9	32.3
Motor gasoline	31.7	17.8	25.5
Kerosine	0.	18.3	5.8
Distillate	72.0	31.6	53.5
Residual	52.6	56.7	65.0
Total	221.6	127.3	182.1

NPA Amends Rulings

WASHINGTON.—The following orders have been issued by the National Production Authority:

Amendment to CMP Reg. 4, March 21: Easing regulations on deliveries of controlled materials by distributors.

Amendment to Dir. 9 to CMP Reg. 1, March 21: Making authorized orders for nonnickel-bearing stainless steel outstanding when it was decontrolled, deliverable on orders bearing a DO rating.

Amendment to M-80, March 24: Listing additional products in which the use of nickel-bearing stainless steel, high nickel-alloy steel, and nickel silver is prohibited.

Revocation of M-59, March 25: Repealing controls on the use and inventory of metal strapping.

Study Begins

WSB taking up oil and gas industry wage controversy

WASHINGTON.—The Wage Stabilization Board is taking up the wage controversy in the oil and gas industry, faced with charges from the steel industry that its six public and six labor members have lined up against the six industry members, and threatened by a congressional investigation.

The charge that the board is "stacked" followed the decision in the steel dispute that wage increases of more than 22 cents an hour should be granted.

This decision also sparked a demand in Congress for a complete investigation to determine, among other things, whether the WSB has adopted policies inconsistent with the intent of Congress with respect to stabilization and against public interest.

Will affect oil.—The board's action in the steel case is expected to have an effect on the oil dispute, stiffening the determination of the unions not to compromise their demands.

Prospects are good for a House investigation of the board in view of the fact that the all-powerful rules

committee, which can prevent a measure from reaching the floor for vote, gave its approval to a resolution by Rep. Leo Allen of Illinois to authorize the labor committee to go into the matter.

A major subject of investigation would be the board's recommendation for a union shop, held to be a matter not related to wages, which Allen charged would destroy collective bargaining "by substituting a government board for the common sense and the judgment of the employer and the employes."

Gas Production Increases

WASHINGTON.—Marketed production of natural gas last year reached a total of more than 7,000,000,000 M.c.f., an increase of 18 per cent over the 1950 total, according to figures compiled by the Bureau of Mines.

The bureau placed the 1951 total at 7,415,600,000 M.c.f., but explained this figure included 87,800,000 M.c.f. exported, lost in transmission, and unaccounted for. The net gas stored, it said, was 128,500,000 M.c.f.

A breakdown of the 1951 use of natural gas indicates that residential consumption was 1,471,100,000 M.c.f.; commercial, 445,900,000 M.c.f.; industrial, 3,495,400,000 M.c.f.; field, 1,364,800,000 M.c.f., and carbon black, 422,200,000 M.c.f.

The greatest expansion in consumption during the year was in the Middle Atlantic region, where an increase of 55 per cent was noted, the bureau said. Consumption in New England was reported for the first time in the fourth quarter of the year, amounting to 1,300,000 M.c.f.

Price Fight Gets Setback

WASHINGTON.—Efforts of the independent producers to secure the raising or elimination of ceilings on crude prices through the Independent Petroleum Association of America have been set back by the Office of Price Stabilization on the grounds that trade associations have no authority to ask for price relief and the protest was not filed within 6 months after the crude-oil-price order was issued.

The OPS, however, left the door open for further consideration of the matter by accepting the I.P.A.A. brief as a petition rather than a protest and association officials have asked for conferences at which the price situation can be discussed.

An effort will be made to have the OPS reconsider its position on the admissability of petitions filed through trade associations. Without the joint presentation of applications for price revision, the present crude-price situation could be strung out indefinitely by requiring each producer to make individual application for relief.

The original Defense Production Act, adopted in 1950, contemplated such representation by associations, according to Russell B. Brown, general counsel of the I.P.A.A.

"The law was intended to provide controls when necessary and relief from controls when necessary," Brown declared. "The administration of the law is delegated to OPS. They can through narrow legalistic regulations, for an industry the size of the oil and gas producing industries, cause the obtaining of relief to come only after long, tedious effort on the part of each separate producer.

"This method would be slow and very expensive and would provide relief only for those with sufficient revenue to afford such indulgence. In the end, the administration would have the same information they could get by one procedure. . ."

Gas Order May Be Relaxed

WASHINGTON. — Possibilities of relaxing PAD Order No. 2, restricting the expansion of natural-gas service in areas of possible shortage, will be explored by a small committee which will be appointed within a few days by C. P. Rather, assistant deputy petroleum administrator for gas.

Decision to set up a committee of not more than 10 members to study the matter and report to the Gas Industry Advisory Council was reached at a meeting of the council March 24. However, opinion as to the action to be taken on the order was so divided that no definite conclusions should be reached.

A review of the situation by officials of the Petroleum Administration for Defense disclosed that conditions have improved since the order was issued last August, largely because the slow pace of the defense program slowed down the additional defense loads which the order was designed to protect. At the same time, large consumers such as power plants have expanded their underground-storage systems, some new pipe lines have come into service with more to come in during the summer, and the past winter, was on the whole reasonably mild.

Synthetics Called Insurance

WASHINGTON.—The Interior Department's synthetic-liquid-fuels program is viewed by Secretary Oscar L. Chapman as "insurance against the day when natural oil is depleted." He concedes, however, that no one can foretell whether, when that day is reached, synthetic fuels, atomic energy, or some other kind of power will be the accepted substitute.

In an address before the Society for the Advancement of Management, Chapman cited the synthetic-fuel program as part of the government's responsibility with respect to natural resources. He explained that while present oil reserves are plentiful the experience of the last war emphasized the fact that they are not limitless.

Interior's Budget Trimmed

WASHINGTON.—The House appropriations committee has trimmed the Interior Department's budget for fiscal 1952 by 21 per cent, to 93 per cent of the total to be provided for the current year. It made a significant exception of the Bureau of Mines, however, which was given $159,800 more than it asked for, and $3,342,944 more than it has this year.

The committee cut $17,000 from the appropriation requested for enforcement of the Connally Hot Oil Act, but left the department with $170,000, or $330 more than the current fund, which, it said, will permit continuation of the program at approximately the present level.

In giving the Bureau of Mines $27,774,800 the committee approved its program for expansion of investigations into the underground gasification of coal and other phases of its synthetic fuel research, which includes a $75,000 project in the testing and gasification of coals in the Pacific Northwest.

The Geological Survey also was given more funds for the coming fiscal year, with $6,525,000, an increase of $716,000, provided for geological and mineral resource surveys and mapping, and $1,110,000, an increase of $174,000, for the supervision of mining and oil and gas leases.

The Bureau of Land Management was cut $700,000 below the budget estimate of $11,450,000 and $257,605 below the appropriations for this year.

Avgas May Tighten Up

WASHINGTON.—Another of the recurrent tight situations in aviation gasoline which have disturbed the refining industry from time to time over the past year is due to develop next month when Air Force requirements will be substantially increased.

Anticipating that military requirements will impose a new strain on the industry, Deputy Petroleum Administrator Bruce K. Brown has sent a telegraphic appeal to refiners to step up their production.

"Air Force requires substantial quantities of Grade 100/130 in April in excess of presently scheduled liftings," Brown wired the refiners. "Request you do everything possible to make available additional quantities of this grade or 115/145 for early lifting either under present contracts or as additional offerings to Armed Services Petroleum Purchasing Agency. This includes any quantity which can be made available by reducing working-stock levels."

Brown pointed out that the aviation-gasoline-supply situation has consistently been critical. However, each

time military requirements have increased the industry has come through with the additional product needed, and has had a breathing spell between increases in which to straighten out its production schedules.

But if the industry is to meet the needs of all users during the next few months, he said, production must be stepped up appreciably over current levels.

OPS to Decide on Ceilings

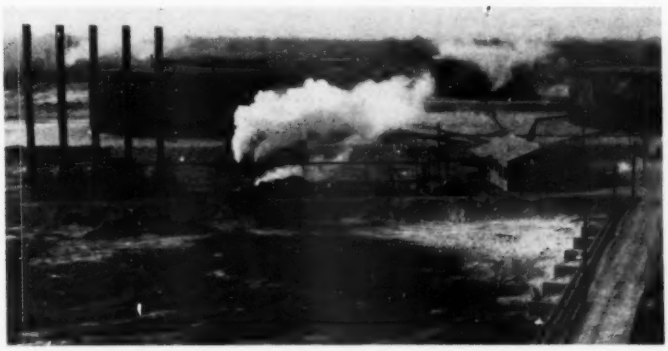
WASHINGTON.—The Office of Price Stabilization has promised to make every effort to reach a decision by May 1 on whether to raise price ceilings of kerosine and distillate on the East Coast.

The commitment by OPS officials was made at the conclusion of preliminary meetings here with representatives of the tanker operators and of the East Coast suppliers and distributors. It is hoped that a determination on the ceiling question will be made by May, so that the pricing structure for the 1952-53 heating season can be established.

The objective of the OPS inquiry, it was explained by Loring T. Cramer, chief of the petroleum branch, is to establish a price structure that will bring enough heating oil to the East Coast to meet consumer requirements at the lowest possible cost to the consumer but at prices which are fair and equitable to the suppliers.

Industry members of the advisory committee set up by OPS to consider the problem declared there is a dislocation between the East Coast prices and those of other areas on No. 2 heating oil, and the former needs to be adjusted upward on the basis of charter tanker rates from the Gulf and other increased cost factors.

GULF COAST



END OF THE LINE.—This terminal at Mobile receives the heavy crude moved by Gulf's "heated" line. Boilers provide steam for coils within tanks to insure fluidity of crude for pumping.

Heated-Oil Carrier

Steam enables Gulf line to move high-viscosity crudes

MOBILE, Ala.—A technique used in gathering systems—heating highly viscous crudes until they flow easily—has been successfully applied to a long-distance crude line by Gulf Refining Co.

The company is moving crude from Heidelberg, Eucutta, Yellow Creek, and Baxterville fields in southern Mississippi to a terminal at Mobile, via a new 152-mile, 10-14-in. steam-heated line.

Combination steam-heated storage tanks and tubular heat exchangers are used for maintaining the oil at a temperature 40° to 50° above normal to improve its flow characteristics

Stations spotted along the line reheat the crude for the following leg of its journey.

Oil from Heidelberg, Eucutta, and Yellow Creek averages between 23° and 24° gravity, and Baxterville crude runs about 16.2° gravity—almost tarlike.

Interstate Oil Pipeline Co.'s gathering system delivers oil from all fields except Baxterville to Gulf's pumping station at Eucutta. Here four 10,000-bbl. tanks fitted with steam coils receive the crude. Baxterville crude is carried by a separate line to Lumberton station storage tanks.

Oil at Eucutta station is heated in the tanks and pumped at high pressure through twin heat exchangers, in which it is reheated.

The 10-in. line from Eucutta to Lumberton can handle 21,000 bbl. daily, and the 14-in., 88-mile leg on to Mobile can handle 42,000 bbl. daily.

Texaco Contracts Lab

HOUSTON.—The Texas Co. last week announced plans for construction of a new laboratory at Bellaire, Tex., for the research division of its producing department.

The laboratory will be erected adjacent to the present production laboratory and the geophysical research laboratory. Contract for construction has been awarded to Texas Gulf Construction Co.

Research-Center Contracted

HOUSTON.—Contract for construction of a $2,725,000 research center here has been awarded Linebeck Construction Co. by Humble Oil & Refining Co.

Humble said construction will begin immediately and is to be completed by late summer of 1953.

Louisiana Raises Allowable

BATON ROUGE. — Unlike Texas, Louisiana plans to increase its production during April.

The state's conservation commission last week set the April allowable at 656,350 bbl. daily, an increase of 2,678 bbl. per day over March's 653,672. Earlier, Texas had set its April allowable at 3,044,340 bbl. per day, a drop of 115,137 from that in effect on March 15 *(The Oil and Gas Journal, March 24, page 86)*

The Louisiana April figure was broken down to show an allowable of 540,984 bbl. daily for South Louisiana fields and 115,366 bbl. daily for North Louisiana producing areas.

Washington Briefs

Charles E. Gately of New York, assistant general counsel of the Petroleum Administration for Defense, has been appointed director in charge of PAD District 1, with headquarters at the New York office of PAD, where he will also serve as counsel for the district.

The Chicago office of the Petroleum Administration for Defense was closed this week as a result of the elimination of spot shortages of products in the Middle West. It was opened to deal with this problem early last year.

Production of 2,000 tank cars during the third quarter has been tentatively approved by the National Production Authority as part of a program of 22,500 freight cars to which may be added 3,139 cars for export to Canada. Actual production, however, may be less than during the second quarter, when materials were allocated for 21,500 cars but builders were authorized to produce another 1,000 cars from materials in inventory.

Drilling Costs Analyzed

Depreciation rates on old rigs too low to provide enough funds for replacement now, West Coast contractors find

LOS ANGELES.—An analysis of drilling contractors' cost data shows that depreciation rates, based on 1945-47 equipment costs are failing to build depreciation reserves fast enough to cover replacement costs at present prices.

This conclusion is reached in a report by the Contractors Statistical Committee of California Drilling Contractors and based on experience data from 30 contractors with 120 drilling rigs.

The committee found that the price of a complete drilling outfit capable of drilling to 6,500 ft. had advanced 70.16 per cent between 1945 and September 1951. Units for 8,500-ft. drilling were up 68.25 per cent for the same period.

The complete outfit for drilling to 6,500 ft. was priced at $304,080.28 last September compared with $178,701.49 in 1945. In addition to complete drilling equipment, stated costs included 7,000 ft. of 4½-in. drill pipe, subs, and drill collars.

Total cost for the 8,500-ft. unit was set at $507,798.25 as of last September compared with $301,815.43 in 1945.

Rig life estimated.—A special subcommittee, working with equipment suppliers and equipment engineers, set up a scale by which the use life of a completely new rig could be measured.

Using this use-life formula, the committee established the value taken out of each new rig for each day of operation.

For the 6,500-ft. rig, the loss in value or required depreciation for each day of drilling was found to be $196.23 on machinery and equipment plus $87.75 on drill pipe and accessories for a total of $283.98 for each operating day. Required depreciation on the 8,500-ft. unit was calculated at $396.53 per operating day.

Operating costs.—From experience data of the contractors taking part in the study, average daily rig operating costs were tabulated by rig sizes and broken down into cost units of labor, maintenance and repairs, rental and depreciation, and overhead. These data are included in Table 1.

Average charges for a 6,500-ft. rig total $711.44 per day and include $151.95 for maintenance and repairs, $98.77 for rental and depreciation, $358.86 for labor, and $101.75 for overhead.

With a new rig it was assumed that maintenance and repair costs would be reduced by 20 per cent, cutting this item for a 6,500-ft. rig to $121.55. On the other hand, the value taken out of a new rig for each day of operation was calculated at $283.98 compared with the average depreciation charge on older rigs of this size of $98.88.

Charges for labor and overhead were the same for both new and old rigs. If the maintenance and depreciation cost items in Table 1 are replaced by the required charges for these items on a new rig, the total daily average operating cost for the 6,500-ft. rig is $866.14, or 21.74 per cent greater than the average used for older rigs now in operation.

AVERAGE DAILY OPERATING COSTS
(6,500-ft. rig)

	From Table 1	Using new rig
Labor	$358.86	$358.86
Maint. and repairs	151.95	121.55
Rent. and depreciation	98.88	283.98
Overhead	101.75	101.75
Total	$711.44	$866.14

On the 8,500-ft. rig, use of new equipment with higher depreciation cost and reduced maintenance results in an increase of 27.82 per cent in total daily cost.

AVERAGE DAILY OPERATING COSTS
(8,500-ft. rig)

	From Table 1	Using new rig
Labor	$358.86	$358.86
Maint. and repairs	197.09	141.40
Rent. and depreciation	123.48	396.53
Overhead	101.75	101.75
Total	$781.18	$998.54

The wide range in daily average costs is shown in Table 2. Averages of the highs and lows are tabulated by rig sizes as well as maximum range for each size.

In the breakdown of costs on rigs now operating, the average over-all percentages of total costs represented by the separate cost units were: labor, 48.23 per cent; maintenance and repairs, 24.06 per cent; rental and depreciation, 14.70 per cent; and overhead, 13.01 per cent.

The committee concluded that many of the cost figures now being used are on the low side and stated that further increases in labor and equipment costs are imminent.

TABLE 1—CONTRACTORS' AVERAGE DAILY RIG OPERATING COSTS

Rig capacity (ft.)	Size crew	No. rigs	Daily average costs (dollars) Labor	Maint. and repairs	Rental and depreciation	Overhead	Total cost
3,500	4	5	307.27	106.04	49.59	76.11	539.00
Per cent of total			57.00	19.67	9.21	14.12	
4,500	4	18	307.27	133.39	69.14	76.11	585.91
Per cent of total			52.44	22.77	11.80	12.99	
6,500	5	26	358.86	151.95	98.88	101.75	711.44
Per cent of total			50.44	21.36	13.90	14.30	
8,500	5	22	358.86	197.09	123.48	101.75	781.18
Per cent of total			45.94	25.23	15.81	13.02	
10,000	5	14	358.86	216.40	141.51	101.75	818.52
Per cent of total			43.84	26.44	17.29	12.43	
12,000	5	8	358.86	260.89	182.27	101.75	903.77
Per cent of total			39.71	28.87	20.17	11.25	

Note: The average costs do not include the following items: Travel or other special allowances to crews due to location, bits, mud or additives, fuels, blowout preventer rentals, fishing tool rental, casing tool rental, moving in and out, rearrangement of equipment to fit location.

TABLE 2—AVERAGE DAILY DRILLING COST SPREAD

Rig capacity (ft.)	No. of contractors	Average high	Average low	Average difference per day	Maximum difference Per day	Per hour
3,500	5	588.18	497.98	90.20	128.23	5.34
4,500	10	620.21	574.50	49.71	108.08	4.50
6,500	10	730.13	669.67	60.46	134.99	5.62
8,500	10	785.53	766.50	19.03	129.52	5.40
10,000	7	854.06	802.41	52.55	156.80	6.53
12,000	3	927.76	864.13	63.63	181.98	7.58

Wildcats Needed

Foree says current drilling not discovering enough oil

BAKERSFIELD.—More exploratory drilling is needed in California, R. L. Foree, director of the production division of the Petroleum Administration for Defense, told the San Joaquin Valley Oil Producers Association at its annual meeting here.

Summarizing last year's drilling

"I wonder what happened to me !", said Alice

ALICE in Wonderland ate the magic cake and grew until she was more than nine feet tall. Our National bureaucracy also seems to have partaken of the magic cake of power. Bureaus in our government have grown in number and scope until their activities now control, to a great extent, the lives of all individual Americans. Department after department adds more and more people -- state, justice, commerce, treasury -- not to mention those sprawling emergency born agencies of price control, N.P.A. and other alphabetical subdivisions.

The number of employees of our federal, state and local governments continues to grow. During many recent months, personnel was added to the federal payroll at the rate of 1,500 daily.

What is the reason for this mushrooming? The Korean War? Threat of war in Europe, Southeast Asia, or the Middle East? Obviously not! A glance at the federal budget gives the answer. The estimated cost of all governmental functions for the fiscal year 1952 is in excess of 70 billions of dollars, an increase of 26 billions, or approximately 60% more than last year.

When will it end? Only you, the individual citizen, who carries the bureaucratic load on his back, can stop it. It will end when enough patriotic men and women demand from congress that the Washington Wonderland start shrinking back to reasonable proportions.

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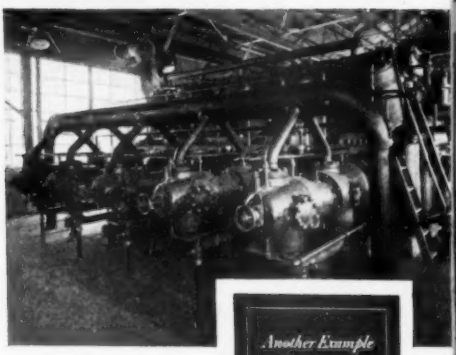

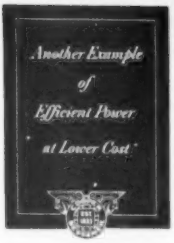

●Look at the size of the building . . and the neat compactness of this 4400-hp GMV compressor set-up. Here, at Depew, Oklahoma Natural Gas Company is equipped to handle approximately 160,000,000 feet per day with a suction pressure of 500# and a minimum injection pressure of 800#—a lot of compressor work with a minimum of installation and operating overhead.

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record, Foree said activity in California was up 27 per cent over 1950 but still not up to the peak of 1948. Of the California wells, 75 per cent were completed as commercial oil wells while the figure for the entire United States was only 53 per cent.

This high success rate, coupled with the fact new oil reserves in California failed to equal its production, he said, was caused by the fact that "you are drilling only in proven fields and not enough of the wildcat variety.

"I hesitate to take you 'A' operators to task about wildcat drilling. Still the facts can't successfully be contradicted. You just aren't drilling enough wildcats."

Steel deliveries cut.—Because there had been a buildup of field steel inventories, and the buildup came because the stocks were not being used, Foree said PAD has reduced deliveries to wildcat stocks for California from 900 tons a month to 300 tons. As of March 1 there were 881 tons of pipe in California wildcat stocks, but during February only 200 tons of pipe was delivered from these stocks he pointed out.

Price Boost Sought

Union asks OPS to grant a 60-cent per barrel increase

LOS ANGELES.—Union Oil Co. of California has filed application with Office of Price Stabilization for an average increase in the price of California crude oil amounting to 60 cents per barrel. Current average price for California crude is $2.35.

In filing application, Reese Taylor, company president, pointed out that total petroleum demand on the Pacific Coast has increased 61 per cent in the past 10 years and is continuing to increase at a substantial rate. California crude-oil reserves, however, are not rising rapidly enough to support the steady demand gain.

In order to support additional production necessary to balance demand, the application estimated that about 495,000,000 bbl. of crude reserves would have to be discovered and developed annually over the next 8 years. During the past 14 years discovery and development have added 367,000,000 bbl. to reserves annually.

During the past 5 years, crude reserves amounting to 189,000 bbl. have been discovered, on the average, for each California well completed, both exploratory and development. Assuming continuance of this discovery rate per well, the discovery of the minimum 3,950,000,000 bbl. of new crude-oil reserves needed by 1960 will require drilling of about 20,900 wells during the 8-year period, or an average of 2,615 wells per year. This number is exclusive of any national defense reserve productive capacity, the application stated.

Based on studies of the relationship between the number of wells drilled in California and the average price of California crude for the period 1929 to 1951, drilling of this number of wells requires, at present economic levels, an average price of about $3.75 per bbl. over the 8-year period.

Imports not feasible.—Large-scale imports of crude from other areas is not economically feasible at present, Taylor stated. Figures quoted showed that the laid-down costs at Los Angeles Harbor of out-of-state and foreign crudes exceed the cost of comparable California crude at the same point by $1.12 to as much as $3.50 per bbl.

Concluding, the application stated:

"It cannot be emphasized too strongly that the Pacific Coast petroleum industry and those dependent upon Pacific Coast petroleum supplies face a crucial situation. Unless additional discoveries are forthcoming in the area, production of crude oil shortly will be insufficient to meet even normal civilian demand, much less possible military requirements.

"The situation can best be alleviated by drilling more wells and the increase of marginal production. The necessary incentive can be supplied only through an immediate and much-needed increase in the ceiling prices of California crude petroleum and petroleum products."

CANADA

Gas Purchase Guaranteed

REGINA, Sask. — Saskatchewan Power Corp. has guaranteed operators in the Brock-Coleville-Elrose-Dodsland area of Saskatchewan that it will "take or pay for" gas from this area a year from the date that reserves of 200 billion cubic feet are proven.

J. A. Darling, minister in charge of the corporation, said the offer was made to encourage companies drilling for oil to test thoroughly for natural gas and to allocate rigs to prove up gas discoveries.

The "take or pay" provision, Darling said, means that the corporation will pay for a certain amount of the gas anyway in case it should not be ready to accept delivery at the specified time.

When reserves reach 200 billion cubic feet, the corporation agrees to purchase half of the gas required for a pipe line to Saskatoon, or 5,000,000 cu ft. per day. This purchase would be prorated among producers in "approximate proportion to the reserves proven by May 31, 1952," Darling said.

Producers would be required to deliver clean, dry gas to a central collection point in the field. Price would be based on a "demand and commodity" rate.

If the corporation builds the pressurizing, cleaning, and collecting facilities to bring the gas from the well head to the collection point, Darling said, the purchase price for the gas will be reduced by an amount which would pay the capital and operating costs of the facilities.

Light-Oil Find Claimed

REGINA, Sask.—The first significant discovery of light oil in Saskatchewan was claimed last week by Canada Southern Oils, Ltd.

S. P. King, vice president of the firm, said the company's Driver No. 4 flowed 33°-gravity crude on a drill-stem test of a 12-ft. section of Viking sand topped at 2,255 ft. Oil reached the surface in 32 minutes

The well is located about 25 miles east of the Alberta boundary and about 5 miles west of the company's Coleville heavy-crude field.

King said drilling will be continued to determine the thickness of the producing section. Cores will be taken at 5-ft. intervals.

Canada Southern is making plans to develop the area immediately upon completion of its Driver No. 4 through the Banff sands. The discovery well is in the southeast portion of the company's 245,000-acre holdings in the southwestern part of the province.

Activity Increase Planned

CALGARY.—Standard Oil Co. of California plans to increase its exploratory activity in Alberta by 40 to 50 per cent during 1952.

In a visit here, R. G. Follis, board chairman, said the company's most intensive exploratory work is now being done in Canada and that a fifth of all the company's exploratory work in North America is now being done in Canada.

Most of the activity is concentrated in Alberta, but the company also is doing seismic work in Saskatchewan and Manitoba.

Firms Increase Nominations

EDMONTON, Alta.—With the break-up of the long Canadian winter imminent, oil companies in western Canada have increased their nominations to the Alberta Petroleum and Natural Gas Conservation Board by 12,925 bbl. for April over March.

For April they have requested 126,220 bbl. daily. In practice the conservation board allowables vary little

from what the oil companies request.

Should navigation on the Great Lakes open prior to May 1 an additional 56,050 bbl. daily will be required by the oil companies.

The largest single nomination for April was from Imperial Oil, Ltd., which has asked for 81,420 bbl. This includes 22,830 bbl. for delivery to Superior, Wis., through the Interprovincial pipe line, and 3,800 bbl. for Lake Superior Refining Co. at Superior.

Products Line Operating

SARNIA, Ont.—Deliveries of gasoline and other products have been started through the 65-mile line from Sarnia to London recently completed by Imperial Oil, Ltd.

Products are going into storage in the extensive tank farm at London East, which is expected to become a distribution center for western Ontario.

The line is being extended to Toronto, with a spur to Hamilton, and is expected to be completed in October. Initial capacity will be 39,000 bbl. daily. Total cost has been estimated at $9,000,000.

Trans-Northern Start Near

TORONTO, Ont.—Construction of the 440-mile Trans-Northern products pipe line from Montreal, Que., to Hamilton, Ont., will get under way as soon as the weather will permit.

All steel for the line is on hand, and storage tanks already are under construction at Port Hope.

The 40,000-bbl. line will carry products of British American Oil Co., Ltd., Shell Oil Co. of Canada, and McColl-Frontenac Oil Co., Ltd., from refineries at Montreal through Cornwall, Maitland, Kingston, Belleville, Port Hope, Toronto, and Hamilton. A branch line will be laid to Ottawa.

It is expected that the line will be ready for operation this fall.

ROCKY MOUNTAIN

Gas Holdings Increased

FARMINGTON, N. M.—El Paso Natural Gas Co., El Paso, Tex., has boosted its holdings of gas-producing acreage in the San Juan basin to more than half a million acres.

During recent weeks, the company added about 240,000 acres to its holdings through Governador, La Plata, Largo, and Blanco gas fields. Gas rights were acquired through deals with Delhi Oil Corp., General American Oil Co. of Texas, A. H. Hill, and others.

The Delhi deal involved about 110,000 acres. Payment was $80,000 for each Mesaverde well and $20,000 for each Pictured Cliffs well, plus a sliding-scale cash payment for each M.c.f. of gas produced each year starting at 5½ cents and increasing 1 cent annually for the next 4 years.

Gas rights on another 80,000 acres were purchased by the company from General American for $1,300,000 *(The Oil and Gas Journal, March 17, 1952, page 364)*.

El Paso is now moving about 165,000,000 cu. ft. of gas daily from the basin to Topock, Ariz., for delivery to California markets.

Williston Gets Sixth Strike

DENVER.—The United States portion of the Williston basin was given its sixth discovery last week with the completion of the C. H. Murphy wildcat at East Poplar, Roosevelt County, Montana.

The well, first dual completion in the basin, flowed oil from both the Charles section of the Mississippi lime and a lower zone tentatively identified as the Mission Canyon member of the Mississippi.

Tests of the upper zone from 5,638-80 ft. flowed 232 bbl. of 40°-gravity oil in 24 hours through 5/32-in. choke with a tubing pressure of 525 psi. The lower zone, perforated from 5,799-5,814 ft., flowed 354 bbl. of 40°-gravity crude in 24 hours through ⅛-in. choke.

Test to Granite Planned

STERLING, Colo.—A Logan County test all the way to granite will be drilled soon by Shell Oil Co. in Mount Hope pool.

The company last week was moving onto location to drill its C. F. Green "A," NE NW NW 30-9n-532.

The well will be the first test below the Lower Cretaceous, which is productive in Logan County and will be the first to test all the way to granite in any producing field in the Colorado portion of the Denver-Julesburg basin.

Five Lines Cross Big Sandy in One Tow

Before the pull and halfway across the Big Sandy River near Catlettsburg, Ky., is this 500-ft., five-line submarine crossing recently completed by Ashland Oil & Refining Co. The multiple crossing, four 6-in. product lines and one 10-in. crude line, was accomplished in one towing operation. Five bulldozers, assisted by a derrickboat, were used to pull the lines, welded to cross pieces, across the river without benefit of skids or tracks. Complicating the operation were frequent rains which turned the working area into a quagmire and raised the river 10 ft. The 500-ft. sections, together with 1,000-lb. concrete weights bolted on at 20-ft. intervals, weighed 85 tons. Crossing the Big Sandy was involved in a line-laying operation, to be completed in April, which will increase the flow of crude from Ashland's Kenova River terminal to the No. 2 plant of its Catlettsburg refinery and will increase the flow of products in the opposite direction.

Another development using

B. F. Goodrich Chemical Company ***raw materials***

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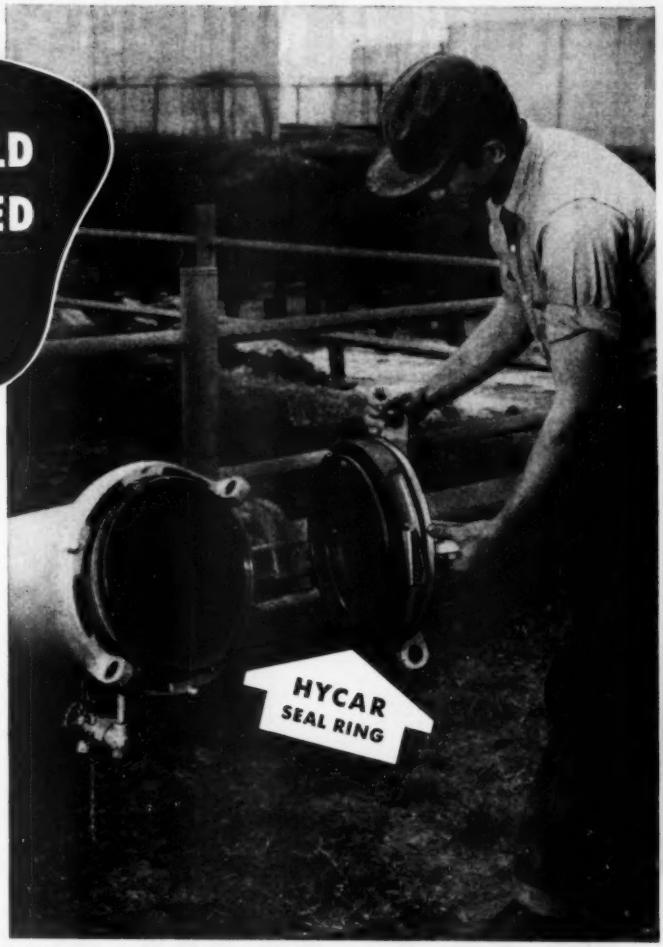

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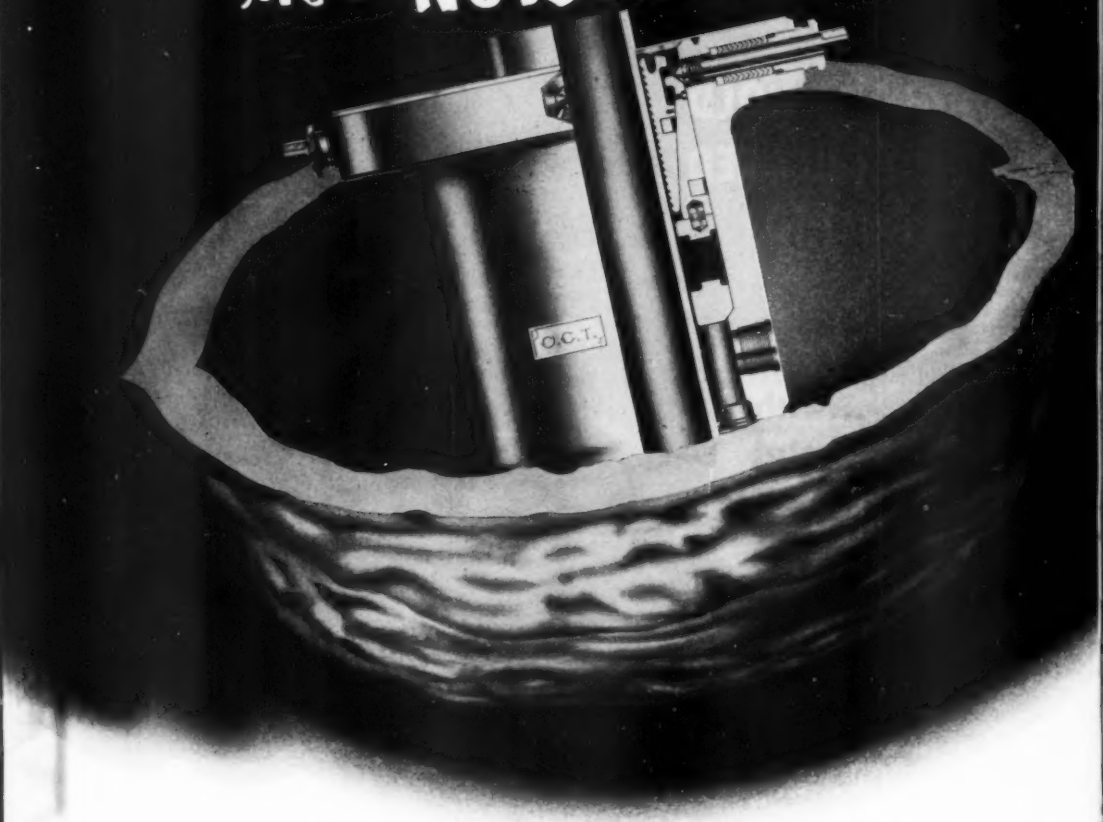

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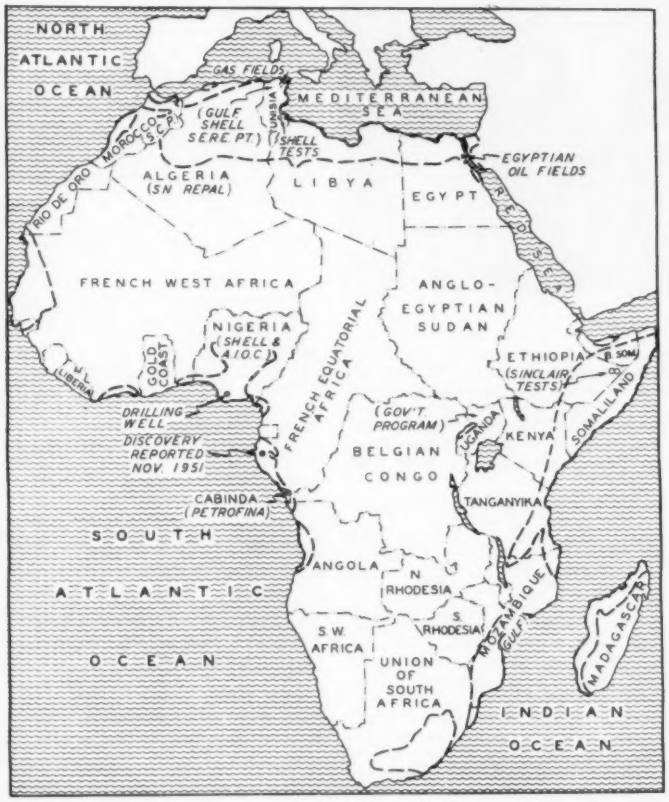


AFRICAN PROSPECTS.—Prospective coastal sedimentary basins in Africa and countries where petroleum exploration is in some stage of progress.

African Oil Search

French, British, Belgian, and American companies trying to find oil in coastal areas on both sides of continent

Dahl M. Duff

THE petroliferous possibilities on both sides of the central part of the African Continent currently are receiving attention in at least eight separate exploratory ventures.

The efforts being made to find oil in this region were again illustrated by the recent start of a second wildcat in southeastern Ethiopia. The test, which may go to 10,000 ft., is being drilled by Sinclair Petroleum Co. near the village of Galadi in Ogaden province.

Besides the Sinclair program, exploration in various stages ranging from preliminary reconnaissance to actual drilling is in progress in Kenya, Uganda, Mozambique, Tanganyika, Madagascar, Liberia, French Equatorial Africa, and Angola.

French, British, Belgian, and American companies are involved in this exploration. Individually, none of the programs is large, but in the aggregate half a dozen rigs and 12 or more geological and geophysical groups are at work in the field.

In nearly all cases, the work under way is in the coastal sections. These areas are more accessible and have obvious economic advantages in exporting whatever production may be found. Furthermore, the coastal zones containing sediments of the marine embayments offer the more attractive geological prospects. The Central African shield rules out large parts of the interior.

Reasons for drilling.—A variety of reasons lie back of this small-scale surge of exploratory activity. In several cases, it is being carried out with the support of the government concerned. European and colonial governments alike are anxious to have the oil possibilities of the territories thoroughly assessed. Nationalistic trends throughout the world have closed many countries to foreign oil capital, but the African governments in general welcome such investments.

Exploration has been carried out at various times during the last 25 years in some of these countries, but with negative results. To some extent, the programs now under way stem from a reappraisal of the prospects in the light of better geological knowledge and improved instruments for oil finding.

Egypt.—Aside from a reported French discovery last November in French Equatorial Africa, there is now no known producing oil area on the African Continent south of the Egyptian fields. Egypt produces approximately 45,000 bbl. daily, about half from the postwar discoveries east of the Gulf of Suez, but the attitude of the Egyptian Government and parliament blocks further exploration, and a gradual decline in this country's output is almost inevitable unless the political and legal situation improves.

French activities.—State-supported French companies have developed a production totaling about 2,100 bbl. daily in Algeria and Morocco, and have hopes of considerably more. Sixteen rigs are running in the French North African territories of Tunisia, Morocco, and Algeria. In Tunisia, two companies, one owned 65 per cent by Gulf Oil Corp., and the other in the same percentage by Shell, have concessions in addition to that of the French organization, SEREPT. Shell is already drilling its first well and Gulf is expected to spud in a well this spring.

French companies also are exploring in Equatorial Africa and Madagascar. These programs as well as the work in the North African territories are a part of the over-all exploration effort which the government is promoting throughout the French Union and which is expected to cost the equivalent of about $275,000,000 during the 1945-55 period.

In Equatorial Africa, Soc. des Petroles de l'Afrique Equatoriale Francaise drilled a well on the Ogowe River about 75 miles northeast of Lambarene which last November was reported to have tested about 16 bbl. along with considerable water from about 3,500 ft. As far as is known,

Nomad Guests at Los Angeles

Foreign guests and the principal speaker at the March meeting of the Los Angeles chapter of Nomads. Left to right, seated, are Charles T. Blanchet, California-Texas Oil Co., Ltd.; W. H. Farrand, of the foreign-production division of the Petroleum Administration for Defense, principal speaker; and Maurice Genini, Soc. Cherifieme des Petrole, Rabat, French Morocco. Standing are Joe Atkins, Basrah Petroleum Co., Iraq; A. F. Driskill, Iraq Petroleum Co., Iraq; and J. Jack Parks, Mene Grande Oil Co., who is en route to Venezuela.

this was the first definite sign of oil in a well in the Central African region. Two rigs are now reported to be running in French Equatorial Africa. In Madagascar, Soc. des Petroles de Madagascar was organized about 2 years ago and is expected to begin drilling this year.

Exploration by a joint Shell and Anglo-Iranian Oil Co., Ltd., company started in Nigeria in West Africa in 1937. The program was resumed in 1946 after suspension during the war. Last September the first deep test drilled in this country was spudded in on the Ikedura structure about 10 miles from Owerri and 80 miles from Port Harcourt. The well is understood to be still drilling, although without indications of oil as yet.

Other operations.—The Belgian company, Petrofina, has negotiated with the Portuguese Government for exploration rights in Portuguese West Africa. The area involved is Cabinda and a part of Angola on either side of the Belgian Congo border. Petrofina, which is interested in Mexico through its part ownership of Mexican American Independent Oil Co., has done preliminary work in this area.

Sinclair obtained its concession over all of Ethiopia in 1945. The terms provide for surrender of half in 1950 and of another 25 per cent in 1955. Two years ago the company drilled its first well, Gumburo 1, in Ogaden Province, going to about 10,200 ft. Information obtained in this well and subsequent geophysical work formed the basis for the second location which was spudded February 25 using the National 100 rig which drilled the first test. The company set 20-in. surface pipe and is planning a thorough test with frequent coring.

Standard-Vacuum Oil Co., which is now doing aerial reconnaissance work in the Bengal Basin of India and Pakistan, is understood to be sending geological teams for preliminary studies this spring in Italian Somaliland and Madagascar. Anglo-Iranian also has become increasingly interested in the prospects in the coastal regions of East Africa.

Mozambique.—The exploration program in Mozambique is being carried out by the Gulf subsidiary, Mozambique-Gulf Oil Corp. The concession over about 45,000 sq. miles of the southern part of the Portuguese colony was obtained in 1948. It was surveyed with the aerial magnetometer, and this was followed by more detailed geological and geophysical work. The company is scheduled to begin drilling its first well on the concession during the next few months.

Tanganyika.—In Tanganyika, D'Arcy Exploration Co., Ltd., and Shell Petroleum Co. are cooperating in preliminary exploration which is investigating likely areas along the coast from the Kenya border south to Mozambique. The government of Kenya has been seeking to interest major operators in oil exploration in that country.

Shell and Anglo-Iranian have been doing some preliminary reconnaissance in Northeast Kenya. In Uganda, the Lake Albert Rift Valley has been under investigation in a government-backed program in which several wells have been drilled.

The Union of South Africa amended its laws in 1951 to allow petroleum exploration on native reserve lands. Numerous unsuccessful efforts have been made during the last 50 years to find commercial oil in South Africa, and as far as is known, there is no important exploration now under way in the country.

Considering the work now taking place elsewhere in Africa, a resumption of some degree of exploration seems likely in the fairly large Karoo Basin in the southeastern part of the country.

Sinai Development Finished

Socony-Vacuum Oil Co., Inc., and Anglo Egyptian Oil Fields, Ltd., have finished development drilling on the Sinai Peninsula of Egypt and suspended further operations pending a change in the Egyptian oil laws.

Socony officials said that reports the company is withdrawing from Egypt are entirely incorrect. Producing operations will continue from the two Sinai fields, Asl and Sudr, which Socony-Vacuum and A. E. O. jointly operate.

New exploratory work has been at a standstill in Egypt since passage of the 1948 mining law which, among other things, requires an offer of 51 per cent of company stock to Egyptians and gives no assurances that a company will receive producing rights after making a discovery on an exploration block.

As a result of this the two companies which operate jointly over most of the Sinai Peninsula confined their work to the confirmed exploitation areas, Asl and Sudr, plus exploration of two blocks granted earlier. One of these was Nebwi, which was tested and turned back, and the other was Ras Matarma, which now stands undeveloped with three shut-in wells.

For the last 2 years drilling in Sinai has been entirely in Asl and Sudr. These two fields produce about 22,000 bbl. daily and are now considered fully drilled. One Socony rig has been operating in Asl and one by A. E. O. in Sudr

In Socony's case, the suspension of drilling meant leaves of absence to 235 employes who mostly made up the work force in Asl.

LATIN AMERICA

Test Slated off Trinidad

Kern Trinidad Oilfields, Ltd., plans to begin drilling in the near future off the Trinidad Coast near La Brea.

A report from Port-of-Spain said R. J. Maitland, Kern Trinidad's general manager, had described the area as promising. The company is interested in an extensive marine concession off Trinidad.

There has long been considerable

interest in the oil possibilities of the Gulf of Paria, both from the Trinidad and the Venezuelan side, and last spring a directional well was brought in on the Trinidad coast near La Brea.

New Venezuelan Discovery

A new field discovery in the State of Anzoategui has been made by the Cantaura well of Socony-Vacuum Oil Co. of Venezuela.

On a drill-stem test the well produced about 400 bbl. daily from a Miocene sand at approximately 10,600 ft. Determination of the extent of the zone and its probable importance await further drilling.

The location is about 9 miles north and slightly east of Mapiri field, which was discovered by Mene Grande Oil Co. and in which both Mene Grande and Socony-Vacuum have production from the Eocene.

Ultramar Sold

Argentina buys oil-company assets for $9,000,000

THE joint refining and marketing subsidiary of Socony-Vacuum Oil Co., Inc., and The Texas Co. in Argentina has sold its 6,000-bbl. daily plant and other physical assets to the Argentine Government. Sale price was reported to be the equivalent of about $9,000,000.

The company is Ultramar S.A. Petrolera Argentina, which, besides the refinery, owned dock facilities, bulk plants in Bahia Blanca, Cordoba, Rosario, and Santa Fe, and approximately 100 service stations.

The refinery at Dock Sud in Buenos Aires runs about 40 per cent lube-type crudes and its lube production meets roughly a fifth of the Argentine market.

Joseph Ryder, president of Ultramar, said in Buenos Aires that the company was not being nationalized in the usual sense. He said the sale was a "matter of mutual convenience" since the company had decided to close out its facilities in any case. The transaction has been completed except for the promulgation of the ratifying decree.

The properties were valued at around $8,000,000. Officials emphasized that the sale was a friendly transaction. Only fixed assets were involved, and the company presumably can continue to sell in Argentina using completely imported products.

Refinery shut down.—The Ultramar refinery was shut down for several months 2 years ago because of the failure of Argentine officials to grant dollar allocations for the purchase of crude. Under British bilateral trade agreements, much of Argentina's oil supply is from sterling sources. The sale of Ultramar leaves Shell and Standard Oil Co. (N. J.) still operating in Argentina with refining and some production. Most of the Argentine oil industry is in the hands of the state organization, Yacimientos Petroliferos Fiscales.

Neither government nor company officials in Buenos Aires would elaborate on reasons for the sale other than to say it was for "reasons for mutual advantage." However, it appeared plain the disposal of the properties resulted from currency difficulties, restrictions on withdrawal of profits, and other headaches of doing business in the tightly controlled Argentine economy.

Comes as shock. — Reports indicated the company's decision came as a shock to Argentine officials. When the company's plan to dissolve became known, the government indicated its readiness to make concessions including a 1952 import authorization to bring in 295,000 tons (about 6,000 bbl. daily) of Mexican and Gulf Coast crude. The government was said to have offered to buy the properties only after the company declared it would sell its facilities for scrap rather than to remain in the market.

It was believed the withdrawal of Ultramar would indirectly improve the position of other foreign business in Argentina since it would bring home to the government the fact that these companies might not continue under present conditions.

In closing up its business Ultramar made plans to pay its 1,200 workers a total of $1,210,000 in dismissal bonuses, voluntarily doubling what is required under Argentine law.

Ultramar declined a government offer to deduct this amount from the selling price and decided to distribute these funds itself. In addition a special fund was established for 91 employes not yet eligible for government pensions.

Ecuador Plant Is Building

A natural-gasoline plant with a daily capacity of between 2,000,000 and 2,500,000 cu. ft. is now under construction by Manabi Exploration Co., Inc., in Tigre field in Ecuador.

The plant is being built by F. S. West Co., Houston.

Manabi also plans construction of a crude-stripping plant which will handle about 2,000 bbl. of 37°-gravity crude and yield an estimated 800 gal. per day of light ends similar in characteristics to natural gasoline.

Output of the natural-gasoline plant is expected to be about 2,500 gal. per day of 14-lb. R.v.p. product. Output of both installations will be blended with a product from Manabi's Cautivo refinery to produce motor fuel.

The new gasoline plant will be of the lean-oil-circulation type and is designed to handle up to 5,000,000 cu. ft. by installation of additional compressor horsepower.

In addition to natural gasoline, the plant can be operated to produce about 1,000 gal. of L.P.G. daily. Residue gas from the gasoline plant will be sold to Anglo Ecuadorian Oilfields, Ltd., for use as fuel in the company's La Libertad refinery, 12 miles away.

Both the stripping and the natural-gasoline plants are expected to be in operation this summer.

MIDDLE EAST

New Kuwait Setup

Gulf annual report gives details on reorganization

THE new operating company which emerged out of the reorganization of the Kuwait operation will be paid a fee of one shilling per ton of oil produced for its services on behalf of the concession-owning companies.

This and other details on the Kuwait reorganization *(The Oil and Gas Journal, February 18, 1952, page 101)* were revealed in the annual report of Gulf Oil Corp., which shares ownership of the Kuwait concession with Anglo-Iranian Oil Co., Ltd.

Formerly the jointly owned Kuwait Oil Co., Ltd., held title to and operated the concession, allocating to its shareholders the oil produced at cost of production plus a shilling per ton (about 2 cents a berrel).

A new Delaware corporation, Gulf Kuwait Oil Co., takes Gulf's undivided one-half through Gulf Exploration Co., while the other half was retained by the old Kuwait Oil Co., Ltd., which has now become a wholly owned subsidiary of D'Arcy Exploration Co., Ltd., and has changed its name to D'Arcy Kuwait Co., Ltd.

This reorganization coincided with the renegotiation of the Kuwait concession contract to a 50-50 sharing arrangement with the Kuwait sheik. The Gulf report commented that the management felt the changes effected by the reorganization were important and most desirable accomplishments. All executives and other employes of the former Kuwait Oil Co. have been transferred to the new service company.

The recently issued annual reports of Gulf and several other companies gave some new information on their foreign operations:

Gulf, on general foreign exploration.—In 1951, in Denmark there were completed one successful deep oil test and five shallow wells in connection with a salt and potash exploratory program. Geophysical work was carried on in British Honduras, Barbados, Mozanbique, Tunisia, and Sicily. Gulf also participated with others in exploratory work in the Bordeaux basin of southern France.

The Magwa well 7 miles north of Burgan field encountered production

in the Burgan sands. No estimate can yet be made of the reserves significance of the field which may be developed at Magwa in Kuwait.

Cities Service Co., on Venezuelan concessions and Mexican exploration. —Cities Service has recently made application to the Venezuelan Government for exploration and exploitation concessions on approximately 450,000 acres in the Maracaibo basin area. In Mexico, a subsidiary is contributing to an exploratory program in the Tamiahua Lagoon south of Tampico in an effort to extend the prolific Golden Lane fields.

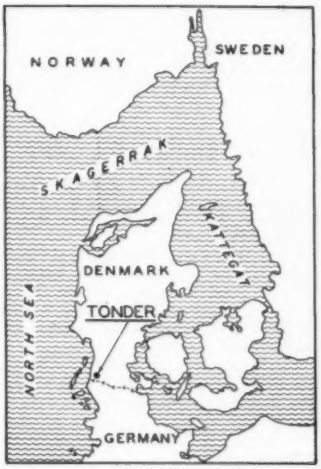
Phillips Petroleum Co., on Venezuelan development and American Independent Oil Co.—The small refinery and wax plant which Phillips is building at San Roque in Eastern Venezuela in compliance with concession contracts will produce 4,000,000 to 5,000,000 lb. of finished wax annually, equal to nearly half of the Venezuelan consumption.

The adjacent stabilization and gasoline plant which recently went into operation will extract 1,000 bbl. of natural gasoline daily. The San Roque pressure-maintenance plant is now injecting 26,000,000 cu. ft. daily into one of several producing sands.

American Independent, in which Phillips has one-third interest, has drilled four nonproductive tests and continues to explore in the Neutral Zone. Aminol has 43 per cent interest in the Mexican American Independent operation which now has 10 wells producing about 3,900 bbl. daily.

Sinclair, on Venezuelan development. — Venezuelan Petroleum Co. (about 86 per cent owned by Sinclair), had a net production in 1951, including natural gasoline, of 3,775,381 bbl., down 43,405 bbl. from 1950.

Toward the end of the year, the downward production trend was reversed, daily net production in December 1951 being 10,805 bbl., as compared with 9,197 bbl. in December 1950. Six producing wells were completed in Guere field discovered in the fall of 1950.



LOCATION of discovery, which is near the German border.

EUROPE

Danish Find

Tonder test likely may be country's first oil strike

DANISH AMERICAN PROSPECTING CO.'s Tonder well in southern Denmark very likely may become the first oil discovery in this nothern European country.

The well recovered good oil shows in cores from a 100-ft. section around 10,150 ft. Complete testing will probably not be carried out until after the middle of the year, since special equipment may be brought in to carry out Hydrafracing in the formation.

The well was drilled to a total depth of 10,247 ft. Further geophysical work is being carried out before location for a second well in the area.

Tonder is about 5 km. north of the German border in southern Jutland. Danish American Prospecting, a Gulf Oil Corp. affiliate, has drilled seven wells in the country. Tremendous quantities of salt were found but no oil prior to the Tonder test.

In addition to the heavy rig which drilled the Tonder and the preceding unsuccessful Gassum test in north-central Jutland, Danish American Prospecting has a light Cardwell rig working in Denmark. This equipment has a capacity of about 4,500 ft. and has drilled several shallower holes.

Area looks up.—The Tonder well and favorable German drilling south of the Danish border have brightened prospects for the development of substantial oil production in this general area. In Germany Deutsche Erdoel, A. G., recently found light oil at about 5,000 ft. in a well near Heide approximately 50 miles south of the border. Other drilling by German operators in the past in northern Schleswig-Holstein to the border has resulted in some shows but no commercial production.

VIEW of Tonder 1 well in South Jutland.

Danish American Prospecting has held a concession in Denmark since 1938, but work was suspended during the war. A new contract was negotiated 2 years ago beginning June 2, 1950, and running for an over-all period of 50 years with an initial 10-year exploratory term. The concession covers petroleum, salt, and various other minerals over all of Denmark, embracing 17,000 sq. miles of land plus adjacent water areas.

International Briefs

Completion of the new 30-in. crude line built by Shell Caribbean Petroleum Corp. from the Maracaibo basin to Cardon in Venezuela is due the latter part of April. The line itself has been laid, but the Palmarego pump station is not expected to be finished until about April 15. Mene Grande Oil Co. and Texas Petroleum Co. have minority interests in the line.

The second meeting of the new European Association of Exploration Geophysicists has been scheduled for May 22-23 in London. The organization was founded on the initiative of M. van Weelden, of Royal Dutch-Shell, during last year's meeting of the World Petroleum Congress at The Hague.

PERSONALS

Jergins President

Pyle's background includes geology, banking, and war

POSSESSOR of a varied career in the petroleum industry is Howard C. Pyle, president of Jergins Oil Co., Long Beach, Calif.

Pyle last week added another job to the many he has held since leaving college—he served as general-arrangements chairman of the joint annual meeting of the American Association of Petroleum Geologists, the Society of Economic Paleontologists and Mineralogists, and the Society of Exploration Geophysicists held in Los Angeles.

Born in Arizona, Pyle graduated from the University of California and received his master's degree in petroleum engineering from the University of Southern California.

He was first employed by Union Oil Co. as a geologist in Venezuela, later returning to California where in a series of rapid elevations he finally became chief production engineer.

He was a member of General Eisenhower's staff in the European theatre, and came out of the army as a lieutenant colonel.

On his return he accepted a position as vice president of the Bank of America in charge of oil industry loans, leaving this in 1947 to accept the presidency of Continental Consolidated Corp. He later resigned that position and went into private consulting practice for a time. In the fall of 1951 he gave up his practice and accepted the presidency of Jergins Oil Co., the position he now holds.

Frank A. Boyd, formerly chief geologist of the Pittsburgh Group of companies of Columbia Gas System, Inc., has joined the staff of **Alden W. Foster,** petroleum engineer at Pittsburgh.

Delmar H. Larsen has opened offices in Los Angeles as a consulting chemical and petroleum engineer and patent agent. Larsen was formerly with Baroid Sales Division, National Lead Co.

Jack C. Cartwright, junior geophysicist for Stanolind Oil & Gas Co., has been transferred from Lubbock to Midland, Tex.

W. W. Cofield, measurement engineer for Transcontinental Gas Pipe Line Corp., has been transferred from Newark to Linden, N. J.

J. C. Sample has resigned as director of Standard-Vacuum Oil Co., effective April 15. He plans to return to California to rejoin the board of General Petroleum Corp. During his affiliation with Standard-Vacuum, Sample was in charge of the firm's operations in South Africa, Australia, New Zealand, and Japan.

Henry F. Straw, engineer trainee for The Texas Co., has been transferred from Liberty to Manvel, Tex., and promoted to petroleum engineer.

GEORGE KOEGLER

George Koegler, a member of the law department of Standard Oil Co. (N. J.), has been appointed executive assistant to **Eugene Holman,** the company president. He succeeds **Dave A. Shepard** who was made a director last December. Koegler, a native of New York City, was in private law practice in New York before joining Jersey Standard in 1943. He has served as the company's liaison with various Washington agencies during the last several years.

M. P. Christensen, engineer for Republic Natural Gas Co., has been transferred from Dallas to Hugoton, Kans.

J. Ackermann, plant-maintenance engineer at Shell Caribbean Petroleum Co.'s Cardon refinery in Venezuela, has been presented the Bronze Lion medal by the director-general of shipping of the Netherlands Government at The Hague. He received the decoration for his work in extinguishing a fire aboard a tanker during a wartime attack by the Japanese in the Straits of Malacca.

G. H. Herridge, formerly general manager in the Middle East for Iraq Petroleum Co., Ltd., has been appointed head of the concessions and administrative division in the London headquarters of the company. Herridge joined the old Turkish Petroleum Co. in Bagdad in 1926 and later served in Kirkuk, Haifa, Baija, and Mafrak. **R. C. Lawson,** who joined Asiatic Petroleum Co. in London in 1926, has been appointed manager of the general department of the London office of Iraq Petroleum.

John B. Hanna has been named general superintendent of the new refinery which Standard-Vacuum Refining Co. of South Africa (Pty.), Ltd., will build at Durban, Union of South Africa. He will move to Durban from Mountainside, N. J., in April when actual construction of Stanvac's $17 million project is scheduled to start. Hanna joined Esso Standard Oil Co. in 1935 and was transferred to Standard-Vacuum's South African affiliate early this year.

L. A. Dibler has resigned as a geologist in the Wichita, Kans., district office of Carter Oil Co. to join Harrington, Lynn & Co., a Billings, Mont., consulting firm.

Don Anderson, superintendent of production in the natural-gas division of Cities Service Oil Co. at Bartlesville, Okla., has been transferred to the firm's Calgary, Canada, staff where he will supervise drilling and production operations in the Canadian plains area. He has been with Cities Service since graduating from Purdue University in 1930.

C. A. Buskel, division gas-gasoline engineer for Gulf Oil Corp. at Tulsa, will head the newly established gas-gasoline engineering unit. **R. M. Stuntz** will head the mechanical engineering section as division mechical engineer, and **S. H. Pope** will be assistant division mechanical engineer. **R. B. Wilkins** will head the petroleum-engineering section as division petroleum engineer with **F. L. Carpenter** as assistant division petroleum engineer. **J. P. Wible, Jr.,** formerly assistant chief production engineer, has been promoted to secondary-recovery advisor on the staff of the manager of exploitation. In announcing these appointments in the exploitation department, **P. H. Bohart,** vice president in charge of the Tulsa division of Gulf, said **E. W. Brake** will continue as chief engineer

PERSONALS

and engineering advisor, and **L. C. Case** will continue to be laboratory director.

Roy Chambers, Jr., production engineer for Standard Oil Co. of Texas at Royalty, Tex., has been transferred to Iraan, Tex., as drilling engineer.

Daniel A. Busch, formerly staff geologist with Carter Oil Co., has joined Zephyr Petroleum Co., Tulsa, as manager of exploration. Busch was a consulting geologist with Huntly & Huntly, Pittsburgh, from 1943 to 1946, when he joined Carter Research Laboratory. He became a Carter staff geologist in 1949. He holds a B.S. in chemistry from Capital University, Columbus, and an M.S. and Ph.D. in geology from Ohio State University. Before entering the consulting field he had taught geology at Pittsburgh University.

Frank Arthur, tool pusher for Cree Drilling Co., has been transferred from San Angelo to Perryton, Tex.

E. A. Bacon, manager since 1946 of the crude-oil department in the Tulsa area of Shell Oil Co., has retired. **Clarence A. Nyhof** will be responsible for coordinating crude-oil activities in the Tulsa area. Nyhof has been with the company for over 28 years.

T. W. Sudberry, tool pusher for Noble Drilling Co., has been transferred from Seminole to San Angelo, Tex.

William J. Mannas, formerly petroleum engineer for Pure Oil Co. at Fort Worth, has joined Magnolia Petroleum Co. at Odessa, Tex., as engineer trainee.

P. De H. Hall has retired from Anglo-Iranian Oil Co., Ltd., after 37 years with the firm. He held various senior engineering posts in the production department and in 1948 was appointed deputy chief engineer and later representative of the Kent refinery.

Seth Raymond Knapp, tool pusher for Falcon Seaboard Drilling Co., has been transferred from Elk City to Ardmore, Okla.

W. W. Hawthorne, party chief for Atlantic Refining Co., has been promoted to district supervisor at Casper, Wyo.

C. Marvin Case, who has been serving as assistant executive secretary of the foreign petroleum supply committee of the Petroleum Administration for Defense and also as secretary of the supply and distribution subcommittee of that group, has returned to his post as head of foreign supply coordination for Socony-Vacuum Oil Co., Inc. **Ralph O. Barr,** of Standard-Vacuum Oil Co., succeeds him as assistant executive secretary of the supply committee, and **Charles M. Furcht,** of Standard Oil Co. (N. J.), has been appointed secretary of the subcommittee.

W. T. Short, geologist for Skelly Oil Co., has been transferred from Athens to Shreveport, La.

J. R. Melton, crew foreman for United Gas Pipe Line Co., has been transferred from Houma, La., to McCome, Miss.

W. Lloyd Haseltine, formerly at Wichita Falls, Tex., has been transferred to Mount Vernon, Ill., as district geologist for Magnolia Petroleum Co.

W. C. Butler, petroleum engineer for Carter Oil Co., has been transferred from Carmi, Ill., to Great Bend, Kans., and promoted to district engineer.

Oscar L. Keesee has been named manager of the Oklahoma City district office of Midstates Oil Co. Keesee was formerly with Superior Oil Co. of California.

Gordon T. Buskirk, formerly West Texas district geologist for Stanolind Oil & Gas Co., has been named vice president and general manager of Vega Corp., an exploration company recently formed in Texas by a group of Southern California operators. **Stanwood I. Williams,** vice president of Thomas P. Pike Drilling Co., is president of Vega.

RECEIVE A.P.I. AWARDS.—Ten men were cited for "outstanding contributions" to the Mid-Continent district of the American Petroleum Institute's Division of Production at the annual meeting of the chapter in Wichita March 21. Photographed at the Wichita meeting were, left to right, J. H. Field, Sohio Petroleum Co., Oklahoma City; Lloyd R. Pickrell, Wichita independent; J. R. Evans, Stanolind Oil & Gas Co., Fort Worth; Herbert Goodpaster, Dallas independent; J. S. Montgomery, Phillips Petroleum Co., Oklahoma City; R. B. Sale, Continental Oil Co., who received the award for J. C. Johnston, of Continental, Denver; and C. H. Keplinger, Tulsa, consulting engineer. In addition to Johnston, citation recipients not present were H. W. Ladd, Stanolind Oil & Gas Co., Tulsa; W. A. Alexander, Shell Oil Co., Tulsa; and Jack Abernathy, Big Chief Drilling Co., Oklahoma City.

Jon T. Moss has resigned as junior petroleum engineer for Carter Oil Co., effective April 15 and will join Magnolia Petroleum Co.'s field research department at Dallas as a research chemical engineer.

Arnold Bunte, petroleum engineer for Vickers Petroleum Co., Inc., who has been in charge of the Oklahoma City office for the past 5 years, will have charge of the new regional office established by the firm in Roswell, N. M. The Midland, Tex., office will be consolidated with the new Roswell office, from which company holdings in West Texas and New Mexico will be handled. Bunte will be assisted by **Lonnie Kemper,** who will continue to handle the production activities of the firm in that area. A regional office will be opened in Ardmore, Okla., and **M. L. McGee** will move there from Midland to take charge. **A. T. Sinclair,** petroleum engineer, will handle the duties formerly performed by Bunte in Oklahoma City. **R. F. Dewey** will be district geologist for the firm in Oklahoma replacing **R. L. Roberts,** who recently resigned to join Sinclair Oil & Gas Co.

PERSONALS

SUPERVISORS CONFER.—Warren Oil Corp. and Devonian Co. conducted a 3-day conference in Tulsa recently for their supervisory personnel. Attending the meeting were, front row, left to right: D. A. Copeland, material man, Abilene, Tex.; R. L. Bonner, district foreman, Graham, Tex.; B. F. Finley, district superintendent, Perry, Okla.; O. W. Hall, lease foreman, Breckenridge, Tex.; Ralph Ackerman, lease foreman, Snyder, Tex. Center row: P. A. Wiseman, executive assistant, Houston; Sherman Fehl, district superintendent, Graham; J. L. Coulson, division production superintendent, Abilene; H. F. Beardmore, vice president, Warren Oil Corp., Houston; E. S. Calvert, president, Devonian Company, Tulsa; M. L. Dale, district superintendent, Garden City, Kans.; Frank Hefner, district superintendent, Kellerville, Tex.; J. Roy Auers, division manager, Abilene; W. S. Shropshire, lease foreman, Graham. Standing are: T. M. Ochiltree, petroleum engineer, Tulsa; Alvin Lamm, district superintendent, Seminole, Tex.; W. T. Dolezal, district production superintendent, Snyder; Carl Woodson, district superintendent, Levelland, Tex.; Carl Jones, district superintendent, Odessa, Tex.; Frank Wolf, West Texas-New Mexico general superintendent, Seminole; W. H. Womack, district superintendent, Columbus, Tex.; J. H. Rogers, lease foreman, Graham; A. J. Evans, division drilling superintendent, Abilene; Sid White, lease foreman, Winters, Tex.; J. P. Hamman, district superintendent, Wichita Falls, Tex.; G. G. Lowe, district foreman, Graham; Price Lea, lease foreman, Kellerville, Tex.

DEATHS

George F. Mitchell, 64, president of Peoples Gas Light & Coke Co. and president of the American Gas Association, died March 26 in Chicago. He entered the public utility field in 1909 and became head of the Peoples company in 1930. He was largely responsible for the introduction of natural gas in the Chicago area in 1931. He also was vice chairman of Natural Gas Storage Co. of Illinois and a director of Natural Gas Pipe Line Co. of America and Texas-Illinois Natural Gas Pipe Line Co. Mitchell's death occurred a day before he was to deliver a speech before the New England Gas Association in Boston. (See Industry Affairs.)

Edwin N. Foster, 57, purchasing advisor for Gulf Oil Corp., died at Houston March 19.

Arnold C. Hackstaff, 57, manager of the Denver district sales office for Youngstown Sheet & Tube Co., died at Denver, March 25.

Gail B. Wilson, 56, a staff assistant in the marketing department of Socony-Vacuum Oil Co., died March 23 at Independence, Mo. He had been with the firm for 20 years.

Malcolm McCaskill, discoverer of the Muldon gas-distillate field of Monroe County, Northeast Mississippi, died recently at Houston, Miss. His holdings recently were acquired by Union Producing Co.

John F. Stevenson, 56, sales representative of Globe Refining Co., died at Pleasant Valley, N. Y., March 20.

Clement W. Wallace, 63, assistant manager of the materials and purchasing department of Mid-Continent Petroleum Corp., died March 23 in Tulsa. He had been with the firm since 1923.

Thomas G. Alvord, who was active in early development of Oklahoma oil fields, died recently at Superior, Wis.

Charlie Wilson, 63, engineer for Gulf Oil & Refining Co. in Port Arthur, Tex., died at Dallas March 20. He had been with the firm since 1917.

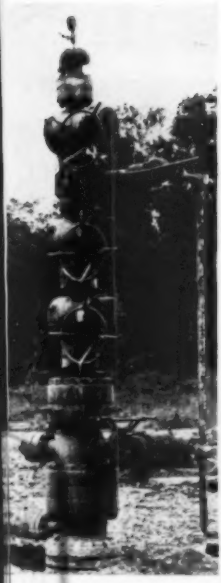
Clyde W. Smith, 62, who retired in 1945 as manager of the safety department of Standard Oil Co. (Ind.), died at Scotts, Mich., March 19.

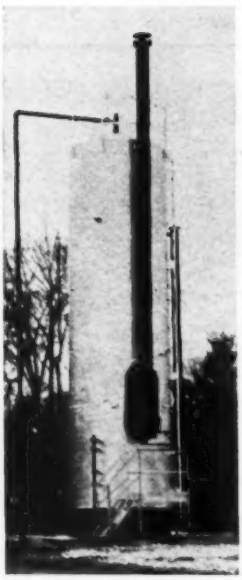
Wingate M. Anderson, 57, retired president of Standard Oil Co. of Brazil, died March 22 at Sharon, Conn. He headed the firm, an affiliate of Standard Oil Co. (N. J.), from 1936 until his retirement in 1950.

F. O. Wilkins, founder and partner in Wilkins & Bissett, Michigan well-servicing concern, died March 19 at Clarksville, Tenn. He had previously been associated with Atha Drilling Co. in Ohio and Michigan.

Harry Boyton Sheldon, 55, driller, died recently at Long Beach, Calif.

F. Warren Butler, 56, marketing executive of Standard Oil Co. (N. J.), died at Bronxville, N. Y., March 19. He had been with Jersey Standard and its affiliates 31 years. Before going to New York in 1948 he was vice president and director of Carter Oil Co., Tulsa, in charge of sales.





Left: Christmas tree at Texaco's 6 Kling-Walet well, Fausse Pointe. Center: Recently installed gin pole for use in measurement of bottom-hole pressure, 6 Kling-Walet. Right: Large 8 by 27.5-ft. emulsion treater, Texaco lease.

New Interest Focuses on Lake Fausse Pointe Field

by Walter Rose
Gulf Coast District Editor

Lake Fausse Pointe field is typical of the highly faulted salt-dome structures found in southern Louisiana. It extends into both Iberia and St. Martin parishes, and most of the wells have been drilled in the waters of Lake Fausse Pointe. While several companies have acreage around the flanks of the dome, at the present time The Texas Co. alone has producing wells. These now total 14, and they have produced to date in excess of 3,250,000 bbl. of oil, mostly from lower Miocene sands. The field was first discovered in 1926.

NEW interest in Lake Fausse Pointe oil field of South Louisiana recently was provided by the completion of The Texas Co. 6 Kling-Walet well, located several miles on land from the nearest other production, and producing from a deep Oligocene sand. Attention to this well has resulted because of the high-pressure conditions which were encountered. Initially a flowing pressure in the tubing in excess of 8,000 psi. was observed. The well, while proving additional acreage in the field, is important since it yields nearly one-third of the field's current 916-bbl. daily allowable.

Occurrence of high-pressure sands in deep wells in South Louisiana is in itself not unusual and 15,000-psi. christmas trees are to be seen on more than one location. On the other hand, the pressure condition encountered in bringing in the Kling-Walet well was more severe than commonly found.

The 183 days required to complete the Kling-Walet well was considerably longer than the completion times of other Lake Fausse Pointe field wells. Yet, drilling to total depth and completing was accomplished without serious difficulty or mishap, and since the high-pressure condition was not expected the successful completion was all the more noteworthy.

Completion details.—While drilling at 14,142 ft. with 14.2-lb. per gal. mud the well started kicking. The blowout preventers were closed, and while conditioning the mud to about 17 lb. per gal. the casing pressure built up to 3,900 psi. The well was then drilled on to a total depth of 15,512 ft. to obtain desired geological information.

After plugging back, the well was perforated in the 14,126-44-ft. interval and a production packer was set at 14,101 ft. The mud in the tubing was displaced with water. The well was opened on 13/64-in. choke with 6,700-psi. tubing pressure and flowed wash water. The well was cleaned on 14/64-in. choke and shut in (an 8,350-psi. shut-in pressure being recorded) and Otis pressure-control equipment was rigged up to set bottom-hole reducing regulators.

One choke was set at 14,068 ft. which cut the flowing pressure down to 6,900 psi. Later, a second regulator choke was set at 12,632 ft. which reduced the flowing pressure to 5,600 psi. on a 13/64-in. surface choke. Finally, an Otis safety valve was set at 11,013 ft. and a portable testing unit was installed to test the well's potential.

Initial Potential

The initial flow of the 6 Kling-Walet well was 486 bbl. per day with a 2,120 to 1 gas-oil ratio. This was gaged using a 10/64-in. surface choke. Flowing pressure and shut-in pressure finally leveled off to 5,200 and 8,600 psi., respectively. A 36.4°-A.P.I.-gravity crude was produced along with about 1 per cent b.s. and w.

Today the well has a 333-bbl. per day allowable and is producing this along with about 10 per cent b.s. and w. The gas-oil ratio has increased to about 2,909 to 1, while the flowing pressure in the tubing has decreased to 4,050 psi. A 1,200-psi. pressure is now recorded on the casing.

Lease equipment.—The well produces through a 15,000-psi. test Cameron christmas tree. A 3 by 10-ft. National indirect line heater has been installed to preheat the oil before it is fed into a large 8-ft. by 27-ft. 6-in. National I.C.P. emulsion treater. Flow is then directed into a 20 by 12-in. by 10-ft. National horizontal-type separator (1,000 psi. working pressure), and thence into a 2.6 by 13-ft. National 2C separator (working pressure 125 psi.). At present a portion of the produced gas is flared, and two 1,000-bbl. oil-storage tanks have been provided.

MATERIALS LIST — TEXACO'S HIGH-PRESSURE 6 KLING & WALET WELL, LAKE FAUSSE POINTE FIELD, SOUTH LOUISIANA

Mud Program

Depth (ft.)	Mud weight (lb. per gal.)	Remarks	Visc.
0- 6,660	9.8-10.1	Untreated	35-42
6,660-10,762	9.7-10.6	Red mud	42-55
10,762-11,566	10.8-11.2	Red mud	48-70
11,566-12,039	11.4-11.6	Lime base	38-45
12,039-13,165	11.6-12.7	Emulsion	50-59
13,165-14,142	13.6-14.4*	Emulsion	52-72
14,142-15,512	16.1-17.1	Emulsion	

*Well kicked at 14,152 ft. Mud weight raised to 17.1 lb. per gal. to get control; lost returns. Used 17.1 to 16.2 lb. per gal. mud for circulation.

WELL-SETTING EQUIPMENT

2½-in. JL tubing.
Top of Baker production packer at 7-in. at 14,101 ft.

Item—	Feet
1—Baker locator sub and testing sub	1.00
1—Joint 2½-in. JL N-80 8RT 6.5-lb. tubing	30.37
1—2½-in. Otis No. 1 landing nipple	2.43
2—Joints 2½-in. EUE JL N-80 8RT tubing	60.72
1—2½-in. EUE TIW safety joint breaks to left-hand rotation	1.12
45—Joints EUE 2½-in. JL 8RT N-80 tubing	1,373.00
1—2½-in. EUE Otis No. 3 landing nipple	2.46
53—Joints EUE 2½-in. JL 8RT N-80 tubing	1,623.82
1—2½-in. Otis No. 3 landing nipple	2.46
360—Joints EUE 2½-in. JL 8RT N-80 tubing	10,964.96
1—2½-in. EUE 8RT N-80 pup joint	10.20
1—2½-in. EUE 8RT N-80 pup joint	6.07
1—2½-in. EUE 8RT N-80 pup joint	8.10
1—2½-in. EUE 8RT N-80 pup joint	4.07
Total string run	14,090.78
Plus distance RDB to THF	16.22
Less amount up for packer weight	6.00
Bottom of tail pipe set at	14,101.00
2½-in. Otis Type "S" landing nipple (No. 1) set at	14,068.00
2½-in. Otis Type "S" landing nipple (No. 2) set at	12,632.00
2½-in. Otis Type "S" landing nipple (No. 3) set at	11,003.00

Left 17.3 lb. oil emulsion mud above packer in casing annulus.

WELL-HEAD EQUIPMENT

1—13⅜ by 9⅝-in. Brewster casing-head assembly threaded for 13⅜-in. 8RT casing and flanged 12-in. Series 900 and grooved 15-in. PD for R-57 ring gasket.

1—13⅜ by 9⅝-in. Brewster Model "DCP" welding flange 12-in. Series 900 with bottom grooved 15-in. PD for R-57 ring gasket and top grooved 12¾-in. PD for R-53 ring gasket.

1—Cameron Type WF intermediate casing-head assembly with bottom flange 12-in. Series 900 grooved 12¾-in. PD for R-54 ring gasket and top flange 10-in. Series 1500 grooved 12¾-in. PD for R-54 ring gasket and having one 2-in. Series 1500 side outlet grooved 3¾-in. PD for R-24 ring gasket.

1—2-in. Series 1500 Nordstrom F-E plug valve grooved 3¾-in. PD for R-24 ring gasket.

1—10-in. Series 1500 Cameron Type W welding flange with bottom grooved 12¾-in. PD for R-50 ring gasket.

1—Cameron Type F tubing-head assembly bottom flange 10-in. Series 1500 grooved 12¾-in. PD for R-54 ring gasket and top flange 10-in. Series 2900 grooved 10¼-in. PD for R-91 ring gasket and having two 3-in. Series 2900 side outlets grooved 3⅛-in. PD for R-87 ring gasket.

1—3-in. Series 2900 Nordstrom F-E plug valve grooved 3⅛-in. PD for R-87 ring gasket.

1—Cameron tubing hanger spool bottom flanged 10-in. Series 2900 and grooved 10¼-in. PD for R-91 ring gasket. Top flange 3½-in. Series 2900 grooved 4½-in. PD for R-89 ring gasket. Bottom flange threaded internally for 2⅞-in. o.d. EUE 8RT tubing.

1—3½ Series 2900 F-E Nordstrom plug valve with both flanges grooved 4½-in. PD for R-89 ring gasket.

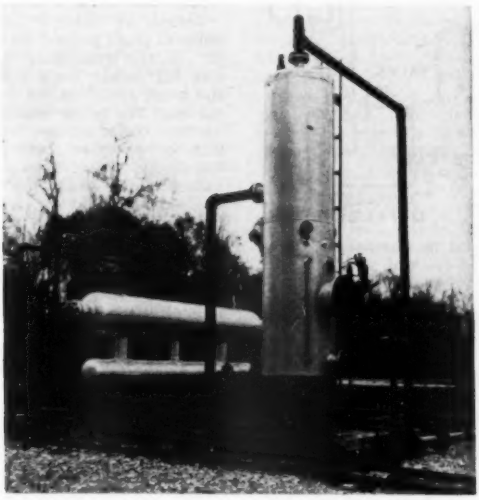
1—3½ Series 2900 F-E Nordstrom plug valve with both flanges grooved 4½-in. PD for R-89 ring gasket.

1—3½ by 3½ by 2-in. all studded tee with top and bottom flanged 3½ Series 2900 grooved 4½-in. PD for R-89 ring gasket. Side outlet 2-in. Series 2900 grooved 3⅛-in. PD for R-85 ring gasket.

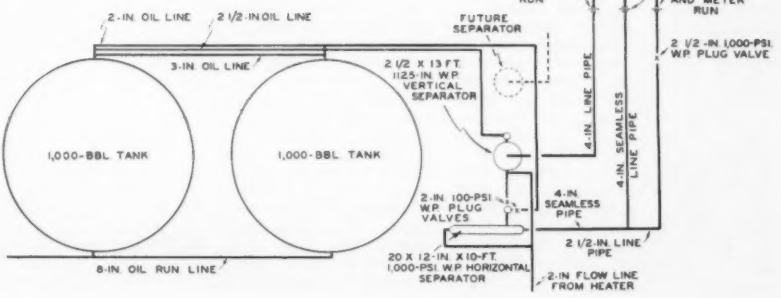
1—2-in. Series 2900 R-E Nordstrom plug valve with both flanges grooved 3⅛-in. PD for R-85 ring gasket.

1—3½ Series 2900 F-E Nordstrom plug valve with both flanges grooved 4½-in. PD for R-89 ring gasket.

1—4-in. 10,000-lb. w.p. Thornhill - Craver christmas-tree cap with inlet flanged 3½-in. Series 2900 and grooved 4½-in. PD for R-89 ring gasket.

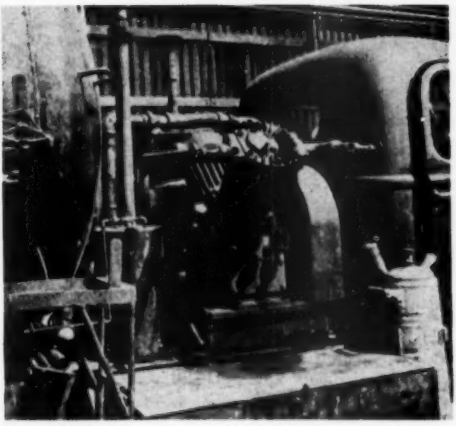


Above: Vertical and horizontal separators. Working pressure of the vertical unit is 125 psi. and that of the horizontal separator is 1,000 psi.


TO FLARE
GAS LINE TO SALES
2-IN. 3000-PSI. BACK-PRESSURE REGULATOR
3-IN 125-PSI W.P. KIMRAY-PARKS GAS VALVES
4-IN. 125-PSI. ORIFICE FITTING AND METER RUN
4-IN. 1000-PSI. ORIFICE FITTING AND METER RUN
2 1/2-IN. 1,000-PSI. W.P. PLUG VALVE
2-IN. OIL LINE
2 1/2-IN OIL LINE
FUTURE SEPARATOR
3-IN. OIL LINE
2 1/2 X 13 FT. 1125-IN W.P. VERTICAL SEPARATOR
4-IN. LINE PIPE
4-IN. SEAMLESS LINE PIPE
1,000-BBL TANK
1,000-BBL TANK
2-IN. 100-PSI W.P. PLUG VALVES
4-IN. SEAMLESS PIPE
2 1/2-IN. LINE PIPE
20 X 12-IN. X 10-FT. 1,000-PSI. W.P. HORIZONTAL SEPARATOR
8-IN. OIL RUN LINE
2-IN FLOW LINE FROM HEATER

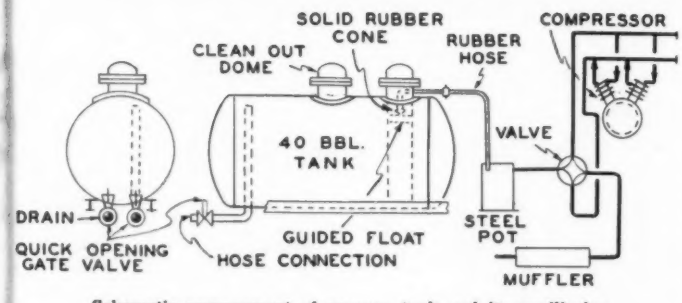
Right: Flow arrangement of treating and storage equipment on Texaco's Kling - Walet lease.

Vacuum-tank truck unit removing water from an excavation.



Drip tank is installed between tank and compressor.

Vacuum Truck Proves Versatile Tool



Schematic arrangement of vacuum tank and its auxiliaries.

by S. J. Arlese*

THE vacuum truck has been found to be a valuable tool—the best tool for certain cleaning operations around Shell Oil Co.'s Wilmington, Calif., refinery. It combines flexibility, adaptability, mobility, labor saving and minimum material handling. These factors mean one thing—efficient, low-cost cleaning operations.

The vacuum truck is a simple piece of equipment, requiring a tank, an ordinary truck chassis, and a gasoline-engine-driven compressor installed between the tank and truck cab. Some vacuum trucks make use of a power takeoff from the truck drive shaft for driving the compressor. The compressor is connected to the top of the tank through a small drip tank which serves to trap any carryover of material. A float valve with a rubber diaphragm is attached to the top dome and closes the suction line when the tank is full. A four-way cock is installed in the manifold between the compressor and the tank in order to convert from vacuum to positive pressure in the tank. A spray header is attached to the rear bumper.

*Shell Oil Co., Wilmington, Calif., refinery.

REFINING POINTERS

Drain-box cleaning.—There are many uses for a vacuum truck around this refinery. For example, trouble has been experienced with the drain box handling effluent from the butane isomerization and alkylation plants. This 5-ft. square box was filled to a depth of about 2 ft. with sludge and emulsion of the consistency of soft plaster. The drain lines were nearly closed. The box could have been emptied by hand, using shovels and buckets. The material could have been dumped on the ground or into a dump truck, moved to the dumping grounds, and shoveled out. A job like this would take about 2 man-days.

Instead of doing it by hand the vacuum truck is used, and much faster. In this procedure the operator and his helper hook the hose onto the truck and drop the free end into the box. The compressor is started, a vacuum pulled on the tank, the suction valve opened, and immediately the sludge level begins to fall. The soft material and water are drawn up quickly, leaving some of the heavy, drier material in the hose. This usually causes clogging. The unit is then shut off until the hose is freed by means of a cleaning hook.

After freeing the hose, the operation proceeds, but the operator adds water from a fire line to thin the sludge. In about 20 minutes the drain box is cleaned down to the concrete floor, and the vacuum truck moves off to unload. At the unloading site the operator starts the compressor, turns the four-way cock in the manifold, and pressures the tank. A few minutes after the discharge valve is opened the tank is empty.

Drain line unplugged.—In another instance a drain line is completely plugged. Water jetting, air blowing, and lancing have had no effect. The vacuum truck is considered worth trying before going to the time and expense of digging up the line. A vacuum truck is brought into position and the hose connected to the seal bend in the drain line with the proper adapter. A vacuum is pulled on the tank, and the suction valve quickly opened. A swishing noise in the vacuum tank is evidence that the plug has broken and that debris is being carried into the tank. In almost no time that line is free and open.

Cooling-tower cleaning.—During annual inspection cooling-tower basins are cleaned with the vacuum truck. The hose is fitted with a fish tail, and used much as a vacuum cleaner. Laborers speed up operations by pushing the soft sediment up to the hose inlet. Note the obvious minimum amount of material handling—no shoveling of heavy mud out of the basin, no slow process of flushing the sediment down the drain.

The vacuum truck also has been used to skim a heavy emulsion from the surface of the water in cooling-tower basins. Again, laborers could remove this emulsion with shovels and scrapers, but the vacuum truck is much more efficient. It provides quicker and more complete skimming, plus the added advantage of much less material handling.

Tank sediment removal.—Another use at the Wilmington refinery was this: An oil tank was out of service for bottom repair. The sediment in the tank was about 18 in. deep and of the consistency of soft mortar. The material would not flow readily to the drain. Even if it had, the operation would have required a temporary steam pump installation, including steam and discharge lines.

The vacuum truck is ideally suited to this operation. Cleaning operations, which are started as soon as the manway is opened and hazardous work permits signed, are completed with dispatch.

Flexibility in operation is one of the prime advantages of the vacuum truck. When, as sometimes happens in tank-cleaning operations, it is found that the material is too heavy for proper handling, a door sheet is removed from the tank and a scraper or drag line used to push the material through the opening and into a collection pit. The pit is fitted with steam coils to reduce the viscosity sufficiently for vacuum-truck operation.

Sometimes a tank has a heavy deposit of scale in the bottom. In this case, instead of shoveling the scale into wheelbarrows, then through the manholes to the ground and finally to trucks, the vacuum truck is set up with a hopper attached to the end of the hose. This hopper serves as a collecting point and is moved around to different areas of the tank as cleaning progresses. In operation where the scale is dry, water must be added at the hopper, not only to provide better flow into the tank, but also to prevent dust from getting into the compressor and damaging the moving parts.

Separator-box maintenance.—Cleaning of refinery separator boxes provides another example of the versatility of vacuum trucks. Cleaning can be done more quickly and efficiently and at much less cost. Most of the separator boxes require a lift of about 14 ft. The average consistency of this material is similar to mixed mortar. To lift this material that distance, water is often added to the suction hose at the bottom of the separator box by means of a tight connection to the air vent pipe of the suction hose. In some cases the air vent alone has been sufficient to cut down the suction line resistance. This usually requires about 21 to 23 in. of vacuum.

In one particular case in the refinery the separator box is so located that the load can be discharged into an adjacent sump without moving the truck. This is done by hooking up about 100 ft. of 4-in. aluminum discharge pipe to the truck and alternately operating under vacuum for loading the truck and under pressure for discharging. Unloading time for 40 bbl. is about 5 minutes. Loading time usually is about 15 minutes.

These are only a few of the many tasks that can be handled quickly and efficiently by vacuum trucks. Other suitable jobs include:

1. Cleaning water and oil out of excavations.
2. Drawing oil from around pipeline leaks, where high capacity is required, to permit plugging or clamping line leaks.
3. Cleaning pressure vessels.
4. Cleaning sumps.
5. Cleaning oil from tank spills.
6. Oiling roadways.
7. Spraying weeds with oil.

Two units.—At present two vacuum units are in operation. One includes a 30-bbl.-capacity tank mounted on a 2-ton Ford chassis. The other utilizes a 40-bbl. tank mounted on a 2½-ton International 6 by 6 chassis. In each case the vessels are of A.P.I.-A.S.M.E. code construction and are designed for full vacuum and 50 psig positive pressure.

The 30-bbl. unit is equipped with a Sutorbilt type 51XB compressor driven by the truck engine through a power takeoff. The 40-bbl. unit is equipped with a two-cylinder single-stage air-cooled compressor. The compressor is driven through a V-belt by a four-cylinder gasoline engine.

Loading protection devices installed on the units include:

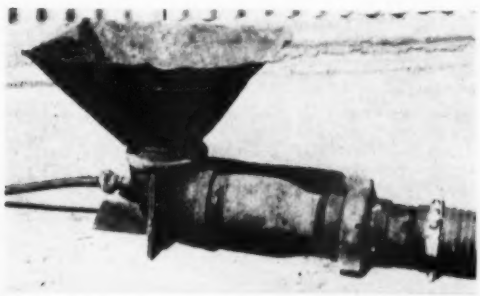
1. A drip tank between the vessel and compressor to prevent carryover of liquid into the compressor.
2. An automatic float-type valve installed within the vessel to prevent overfilling by closing the suction line.
3. A relief valve to protect against overpressuring.

Limitations.—There are some practical limitations in the use of these trucks. Dry materials should be wet before passing into the truck, in order to protect the compressor. Injection of water and/or air may be extremely effective in handling some materials such as the slimes and sludges that are found in separator boxes.

Vacuum trucks have not been used for handling any light products, such as gasoline, because air might be drawn into the hose when the bottom is reached, or through vortexing.

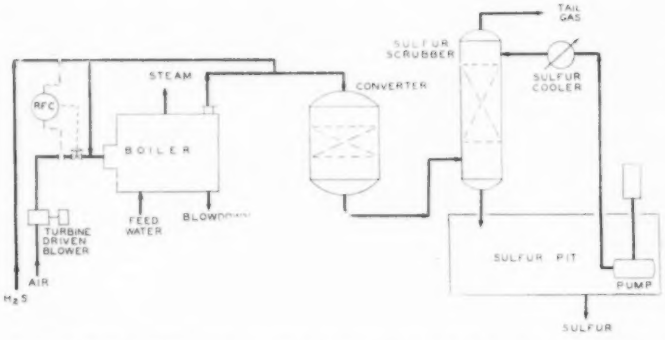
Care must be taken when handling materials which foam under vacuum conditions. Recently a vacuum truck was used to clean up some hot residuum that had boiled over from a storage tank. As soon as the material was drawn into the vacuum tank, it started to foam. The foam, being too light to actuate the float valve, carried over through the drip tank into the compressor. After the job was completed, the compressor had to be dismantled to remove the tarry materials from the working parts.

Foaming also occurs when certain other oils are handled. Although these oils do not cause sticking, they do get into the crank case and make it necessary to change oil at frequent intervals.



Hopper used with vacuum tank for cleaning storage tanks.

Fish tail for use in cleaning tanks and condenser boxes.



General flow arrangement of plant for processing H S to elemental sulfur.

SULFUR FROM H_2S

by Dr. J. L. Parker

At current prices, sulfur-conversion plants of less than 20 tons per day production capacity can be profitably operated. Minimum capacity for such plants run to 5 tons daily

MANUFACTURE of elemental sulfur from H_2S has been known for about 80 years. However, it has been only recently when sulfur-recovery processes have been considered and applied so widely. The reasons for this increased interests are logical.

First, hydrogen sulfide is being produced in increasing quantities through refining sour crudes, and processing increased quantities of sour gas, also, the presence without proper disposal of H_2S is dangerous and obnoxious.[1]

Secondly and very importantly, we have the improved economic status of sulfur, making all reconsider before wasting a sulfur-containing compound. When modern sulfur-recovery processes were first being tried in this country the price of sulfur was about $13 per long ton and the supply from the mines in southern Louisiana and Texas was apparently more than adequate and inexhaustible.

The price of sulfur has increased to $22 per long ton and under present conditions will increase further. From what one can read our supply of mined sulfur is adequate for our present consumption. However, since

[1]Girdler Corp., Tulsa, paper presented at Western Petroleum Refiners Association, Beaumont, Tex., regional technical meeting.

What Are the Costs of These Small Sulfur Plants . . .

CONSIDERING the economics of sulfur-recovery plants, we will proceed on the following bases. First, if a Gibotol plant (H_2S extraction) is required for the single purpose of isolating hydrogen sulfide for conversion into elemental sulfur, a 50-ton sulfur-production plant is probably the minimum size plant that should be considered. The reason for this is that the Girbotol plant will represent approximately 50 per cent of the total investment. However, in most cases involving sulfur tonnages of less than 50 tons, a Girbotol plant is required or could be used to advantage to meet various specifications or to avoid corrosion.

With the Girbotol plant investment not being charged against the sulfur-plant investment, it is well established that a production of 20 tons of sulfur per day is an economically feasible venture at present prices. However, in many refineries there is less sulfur available and the question arises as to what is the minimum size plant which is economical.

The investment costs included in this study are based on a single-stage plant recovering 80 - 85 per cent of the available sulfur. (This plant if selected as a two-stage plant will cost approximately 30 per cent more and as will be noted the justification of this increased investment cost is dubious.)

Plant investment and operating costs are based on the following:

1. Labor.—This cost is taken at $2 per hour per man for 365 days per year. A plant can be designed so that it will require the attention of only a part-time operator. However, to be very conservative, we have figured cases for a full-time operator and a half-time operator.

The sulfur is considered for these cases to be stored and shipped as a liquid to avoid additional labor costs. Provisions for storage of liquid sulfur have been provided in the cost estimates.

2. Steam.—The plant will produce sufficient steam (approximately 2 lb. per lb. of sulfur) to operate the air blower, the exhaust steam being used for jacketing, etc. No facilities have been included for condensing the low-pressure steam as these facilities are usually present in a refinery.

3. Treated boiler feed water.—No facilities have been included for treating this water as again they are usually present; however, pumps have been provided. Approximately .6 g.p.m. per daily ton of sulfur is required and a value of 50 cents per 1,000 gal. has been used as the cost of this water.

4. Electricity. — Since the major power load is the air blower, this is steam driven. Electricity is used in pumping sulfur either for storage or condensation of vapor sulfur. We have selected the maximum which will amount to 0.55 kw-hr. per ton of sulfur produced. A value of 1 cent per kw.-hr. is used.

5. Maintenance.—Since we are dealing with corrosive gases, the maintenance will vary.[2] We are using a value of 25 per cent of the equipment cost per year which we believe is very conservative.

6. Value of H.S.—We are assuming that the hydrogen sulfur is owned by the company concerned. It is probably being burned as fuel, so figuring a heating value of 500 B.t.u., we are using a value of 7½ cents per 1,000 standard cubic feet.

7. Interest on money investment.—In the cost estimate interest is included at 4 per cent of the investment cost.

8. Overhead.—We are using an average figure of 25 per cent on the direct operating costs including the value of H.S.

9. Amortization. — In calculating total costs we are using a 7-year period, as a 5-year amortization is being granted on 75 to 85 per cent of the investment.

we have undertaken to supply the world with our natural resources and the world is anxious to receive these resources due to the lower cost. (European sulfur costs from $75 to $100 per ton), a shortage has resulted. This caused a recent 10 per cent cut in supply to all sulfur users.

Even were we to keep the mine sulfur for our own uses, sulfur recovery from H_2S would continue to expand. The low-cost mines are being exhausted and are being replaced by the high-cost operations. Gradually we are approaching the point where sulfur can be produced from pyrites, our most plentiful source, but this production will require a sale price of sulfur of approximately $30 per ton. With these processes the recovery of sulfur from H_2S will be competitive down to very small plants.

Sulfur vs. Sulfuric Acid

Since the recovery of sulfur has so many advantages, the question arises as to why one should not go directly to sulfuric acid which primarily is the product in which we are most interested. This is entirely feasible as long as there is a sulfuric acid plant on hand such as the one at the Cities Service Lake Charles plant.[3] However without a plant available, it is more economical and feasible to recover the sulfur, and if sufficient quantity of sulfur is available and a market or use for the sulfuric acid is at hand, build a separate acid plant.

The manufacture of sulfuric acid directly from H_2S rather than from sulfur involves a greater cost due to greater volumes of gas to be handled, especially when CO_2 and hydrocarbons are present. In addition, unlike burning sulfur, the combustion of H_2S produces water. The resulting gases must be cooled, dried, and reheated for the production of sulfur trioxide. Corrosion in this cooling and drying equipment is severe.

Development of Sulfur Processing

Briefly discussing the history of sulfur recovery from hydrogen sulfide, the first process was developed by C. F. Claus. Originally the H_2S was burned in the presence of an iron oxide catalyst. Here the combustion of H_2S to SO_2 and conversion to sulfur all took place in one reactor. The high temperature resulted in only partial conversion.

I. G. Farbenindustrie improved the Claus process by separating the reactions as they are used today: namely, burning one-third of the hydrogen sulfide to form SO_2, and reacting the SO_2 with the unburned H_2S in another vessel to form sulfur and water vapor.

However, the first processes used in this country were the Ferrox and Nickel processes. Hydrogen sulfide was absorbed in a solution of soda ash. The hydrogen sulfide was converted to sulfur by air oxidation in the presence of a catalyst (iron oxide in the Ferrox process, and nickel sulphate in the Nickel process). The sulfur formed precipitated and was recovered in a colloidal form.

The Ferrox and Nickel processes were replaced by the more efficient Thylox process. Here the H_2S is absorbed in a solution of sodium thioarsenate and is converted to sulfur and recovered as a paste by air oxidation. The solution is regenerated by this oxidation for further H_2S absorption. This sulfur can not be used, however, for sulfuric acid manufacture due to the presence of traces of arsenic which poisons the sulfuric acid catalyst.

Girbotol process.—The above processes were not practical for treating gases containing high concentrations of acid gases and the need for such

(Continued on page 95)

15 Tons and Less?

CASE 1—15 TONS (4,950 TONS PER YEAR) SINGLE-STAGE COST—$120,000

Gross Income—15 x 22 x 330 — $108,900

Operating Cost:	
1 Man — @ $2.00 per hour	$17,520.00
Electric— 15 x .55 x 24 x 330 x .01	654.00
H_2O— 15 x .6 x 1,440 x .0005 x 330	1,990.00
Maintenance @ 25 % Equipment	15,000.00
Value of H_2S as Fuel @ 7½¢/ 1,000 S.C.F.	12,160.00
Interest @ 4% of Investment	4,800.00
Overhead @ 25% of Direct Costs	11,831.00
Amortization on 7 year basis	17,143.00
Total Cost	$81,098.00

Cost per ton — $16.40
Profit before taxes — $ 27,802
Payout before taxes and without amortization — 2.67 years

Operating cost based on ½ operator:	
Labor	$ 8,760.00
Electricity	654.00
Treated boiler feed water	1,990.00
Maintenance	15,000.00
Value of H_2S as fuel	12,160.00
Interest	4,800.00
Overhead	9,641.00
Amortization on 7-year basis	17,143.00
Total Cost	$70,148.00

Cost per ton — $14.15
Profit before taxes — $38,752
Payout before taxes and without amortization 2.15 years

Operating cost calculations vary from company to company but it is believed that the above costs are conservative and the total costs derived will be realistic.

Investment costs.—As is well known, the cost of plants vary widely, depending upon the specifications required by the customer, the degree of automatic operation desired, and the efficiency of the plant. The investment costs cited are conservative and represent a completely automatic plant, following refinery practice.

Gross income.—This has been calculated based on long tons (2,240 lb.) of sulfur produced at $22 per long ton. The annual production is based on 330 operating days which is conservative for this type of plant.

The above items result in the following cost calculations.

CASE 2—10 TONS (3,300 TONS PER YEAR) SINGLE-STAGE COST—$80,000

Gross Income 10 x 22 x 330 — $72,600

Operating Costs:	
Labor	$17,520.00
Electricity	436.00
Treated boiler feed water	1,326.00
Maintenance	10,000.00
Value of H_2S	8,100.00
Interest	3,200.00
Overhead	9,345.00
Amortization	11,430.00
Total Cost	$61,357.00

Cost per ton — $18.60
Profit before taxes — $11,243
Payout before taxes and without amortization — 3.54 years

Operating costs based on ½ operator	
Labor	$ 8,769.00
Electricity	436.00
Treated boiler feed water	1,326.00
Maintenance	10,000.00
Value of H_2S	8,100.00
Interest	3,200.00
Overhead	7,155.00
Amortization	11,430.00
Total Cost	$50,407.00

Cost per ton — $15.20
Profit before taxes — $22,193
Payout before taxes and without amortization 2.39 years

CASE 3—5 TONS (1,650 TONS PER YEAR) SINGLE-STAGE COST—$50,000

(Use of a full-time operator and same cost procedure as above shows that the plant is not economical).

Gross income 5 x 22 x 330 — $36,300

Operating costs based on ½ operator:	
Labor	$ 8,760.00
Electricity	218.00
Treated boiler feed water	663.00
Maintenance	6,250.00
Value of H_2S	4,050.00
Interest	2,000.00
Overhead	4,985.00
Amortization	7,143.00
Total Cost	$34,069.00

Cost per ton — $20.60
Profit before taxes $2,231
Payout before taxes and without amortization — 5.35 years

Drilling and Completing in the Spraberry Trend

by Leonard O. Franklin*

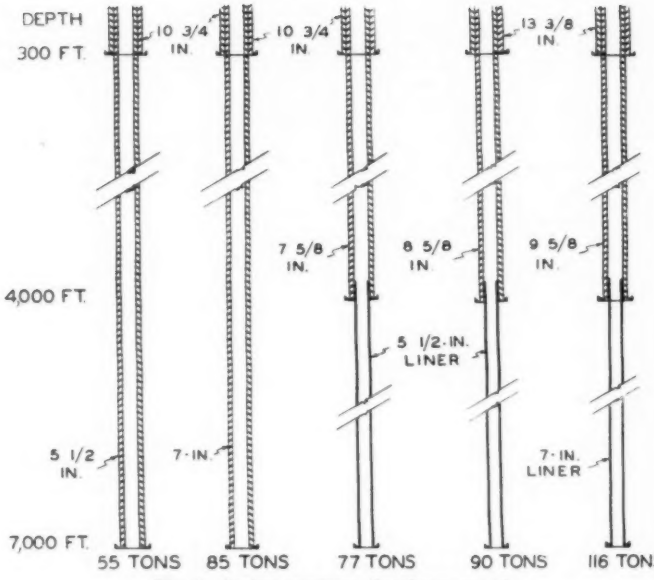


Fig. 1—Casing program, Spraberry trend.

IN the Spraberry trend a total of 582 wells were producing as of October 1, 1951, and over 200 rigs were operating. Of these producing wells, 41 per cent were completed with a salt string set at approximately 4,000 ft. Standard practice is to set the liner or long string above the Spraberry sand before the pay interval is drilled.

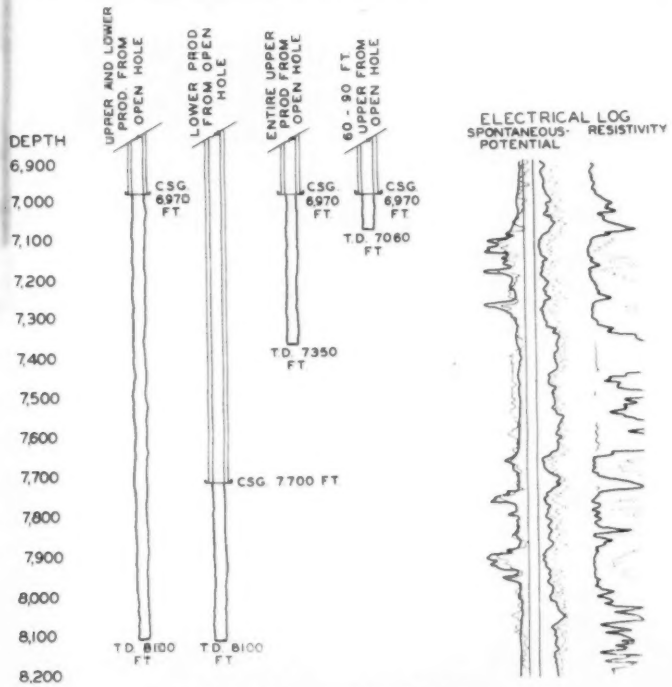


Fig. 2—Completion practices, Spraberry trend.

Practically all operators cement each string of casing in a single stage, circulating slurry only behind the surface pipe.

Mud problems are not considered serious; however, a light system must be maintained while drilling weak formations below 4,000 ft.

Majority of operators drill the pay interval with rotary tools, using crude oil as the circulating fluid; although some prefer to penetrate the Spraberry with cable tools.

Over-all, 82 per cent of the completed wells were Hydrafraced during the initial completion operation. The remaining 18 per cent were shot, acidized, or completed naturally.

Average time necessary to drill and complete a Spraberry well with rotary tools is 36 to 40 days.

Drilling Techniques

While drilling to a depth of 4,000 ft., from 3 to 15 drill collars are employed with rotary speeds of from 70 to 125 r.p.m.

Some operators carry a small amount of weight and tend to "wash" the hole down by maintaining high pump pressures and rotary speeds, while others maintain slower rotary speeds in conjunction with more weight on the bit. Practically no difficulties are encountered during this operation.

Below 4,000 ft., 15 to 25 drill collars are used with rotary speeds ranging from 65 to 90 r.p.m. The pump pressure is kept at a minimum, usually below 500 psi., due to the lost-circula-

*Magnolia Petroleum Co., Midland, Tex.

paper presented at Spring meeting of Southwestern District Division of Production, A.P.I., Shreveport, La., March 5-7, 1952.

tion hazards. An average of 35,000 lb. is carried on the bit.

Though conventional rock bits are used from top to bottom, no unusually hard formations are penetrated while drilling Spraberry wells. From 25 to 40 bits are needed to drill to the top of the Spraberry sand.

Casing Programs

There are two general types of casing programs used. One practice is to set pipe through the salt section at approximately 4,000 ft. prior to drilling to the casing point above the Spraberry sand. The other program consists of drilling all the way from the surface casing to the top of the pay before running pipe.

On the basis of a survey in which various operators submitted data on 274 producing wells, an average of 33 days is required to drill and set pipe above the Spraberry sand using either a two-string or a salt-string-liner casing program. Therefore, it appears that the only advantage of setting the salt string lies in the reduction of the mud cost by minimizing lost-circulation difficulties. The disadvantage is the additional tonnage of steel required. Currently, operators are using both types of casing programs, depending largely upon the availability of pipe.

As shown on Fig. 1, the size of casing used in both types of programs varies considerably. The salt string ranges from 7⅝ to 9⅝ in., while the liner and long string varies from 5½ to 7 in. As of October 1, 1951, 238 wells (or 41 per cent) were completed with the salt-string-liner casing program.

Also, as shown on Fig. 1, the tonnage of steel required for each program varies from 55 tons for the long string of 5½-in. casing to 116 tons for the 9⅝-in. salt string with a 7-in. liner. These figures do not include the tubing or well-head equipment.

Cementing Practices

Cementing techniques vary widely among the operators. The majority are following the practice of only cementing around the shoe and a short distance behind the pipe. A few are circulating cement behind the salt string, liner, and long string.

As a rule cement can be circulated in one stage behind the salt string, but in order to obtain a complete fillup behind the long string and liners, from two to five stages are necessary. The operators who are not going to the additional expense of stage cementing, feel that the Spraberry wells will have a relatively short producing life and that corrosion will not present a very serious problem.

Gel and perlitic material are used by practically all operators to reduce the hydrostatic head against the formation during the cementing operation. When these materials are used, a small neat cement slurry is pumped behind the main slurry in order to insure a good cement bond around the casing shoe or behind the perforations.

Mud Programs

Mud problems are not considered serious as no special characteristic is necessary other than keeping the weight to a minimum while drilling the weak formation below 4,000 ft. The most noticeable lost-circulation zones are at approximately 4,300, 5,300, and 6,500 ft., with some difficulty encountered at any depth below 4,000 ft.

Clear water is used to spud and set surface pipe at approximately 300 ft. Clear water is also used to drill out below surface casing, but the red beds encountered to a depth of approximately 1,100 ft. quickly build a high-viscosity native mud which is controlled by the addition of fresh water.

Salt and anhydrite beds penetrated from 1,100 to 4,000 ft. completely saturate the mud during the drilling operation. The native mud, weighing from 10.6 to 10.8 lb. per gal., is often used to run the salt string without further treatment.

After the salt string is set, the saturated salt mud is jetted and the pits cleaned thoroughly. Fresh water is used to drill out below the salt string and the weight is maintained at approximately 8.3 lb. per gal. by the addition of crude oil. In the event that lost-circulation difficulty is encountered under these conditions, lost-

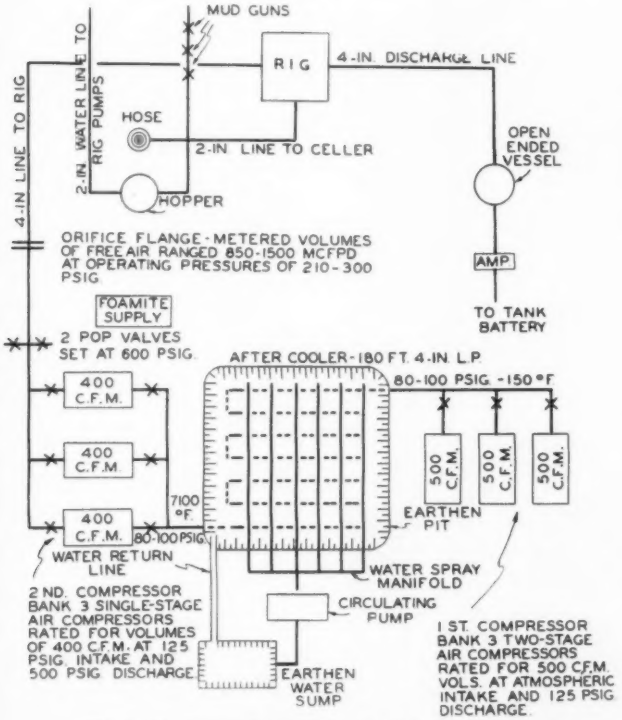

MUD GUNS
RIG
4-IN. DISCHARGE LINE
4-IN LINE TO RIG
2-IN. WATER LINE TO RIG PUMPS
HOSE
2-IN. LINE TO CELLER
HOPPER
OPEN ENDED VESSEL
ORIFICE FLANGE-METERED VOLUMES OF FREE AIR RANGED 850-1500 MCFPD AT OPERATING PRESSURES OF 210-300 PSIG
AMP
TO TANK BATTERY
FOAMITE SUPPLY
2 POP VALVES SET AT 600 PSIG.
AFTER COOLER-180 FT. 4-IN. L.P.
80-100 PSIG. -150°F
400 C.F.M.
400 C.F.M.
400 C.F.M.
500 C.F.M.
500 C.F.M.
500 C.F.M.
7100 °F.
80-100 PSIG
EARTHEN PIT
WATER RETURN LINE
WATER SPRAY MANIFOLD
CIRCULATING PUMP
2 ND. COMPRESSOR BANK 3 SINGLE-STAGE AIR COMPRESSORS RATED FOR VOLUMES OF 400 C.F.M. AT 125 PSIG. INTAKE AND 500 PSIG. DISCHARGE
1 ST. COMPRESSOR BANK 3 TWO-STAGE AIR COMPRESSORS RATED FOR 500 C.F.M. VOLS. AT ATMOSPHERIC INTAKE AND 125 PSIG DISCHARGE.
EARTHEN WATER SUMP

Fig. 3—Diagrammatic arrangement of air supply system.

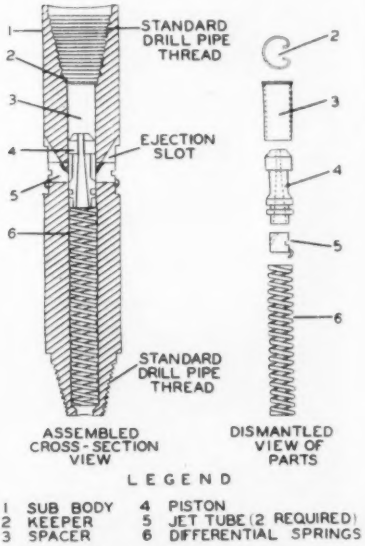


Fig. 4—Drawing of sub.

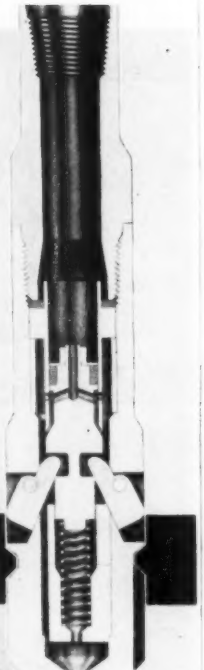
Ole Multi-Knife is DEPENDABLE . . . *but*

Perfected in 1938, the Multi-Knife Casing Mill has proven its value by quickly removing any length section casing desired — N-80 grade down. Its most frequent use is for side-tracking in open hole off a whipstock — eliminating the hazard of deflections through slotted windows.

CONCENTRIC ROTATION

Bottom view of knives milling, showing path of rotation.

A typical dull knife after milling. Note portion of knife unused.



A-1 BIT & TOOL CO.

TEXAS	LOUISIANA	ILLINOIS	WYOMING
Beaumont	Houma	Olney	Casper
Corpus Christi	Lafayette	Beash-Ross Tool Co.	W. A. Posey (Sure-Shot) Beash-Ross Tool Co. (Sidewall Cores, Milling, Side-tracking and Burris Key Seat Wiper)
Kilgore	Lake Charles		
Midland	New Orleans		
Victoria		CANADA	
	CALIFORNIA	Calgary	
OKLAHOMA	Los Angeles	Edmonton	
Duncan	Beash-Ross Tool Co.	Impert Tool Co.	
Oklahoma City			

Milling Rates Increase 100% With New Tool

Old tool made hazardous jobs easy; New tool reaches realm of "the impossible".

In 1938 the inventive genius of the late S. Robishaw of A-1 Bit & Tool Company was again evidenced by the introduction of a tool which was to save the oil industry millions of dollars. The tool not only gave the industry an economical method of salvaging costly casing, but it also made possible the development of cased off sands—at that time a hazardous operation. To Robishaw, a man of practical ideas, inventor exceptional, the industry has openly expressed its appreciation by action.

Tested On 300 Wells

The first working models of the Multi-Knife Casing Mill, as it was called, were initially tested September, 1939, in the Loudon Pool area at St Elmo, Illinois. Using six drilling rigs, sections of pipe were removed from 300 wells. From one to three sections were milled out of each well, in some cases aggregating to as much as 75 feet of casing being removed! The operation permitted coming back from depleted lime production in order to fracture tight sands at shallow depths with nitro-glycerine.

Almost immediately greater demands were placed on the tool than ever foreseen. With the tool's ability to remove complete sections of casing, one of its greatest uses was for side-tracking off a whipstock in open hole. Here it answered the need to eliminate the hazardous method of side-tracking through a slotted window in casing, which sometimes hung or damaged expensive drill pipe. It provided an open hole for acidizing, for gravel packing, for setting screen against virgin sand, for by-passing stuck liners, and for salvaging stuck or twisted casing.

Idea For New Tool

In 1949 a new tool came off the drawing boards of the A-1 Engineering

Research Department. Basically it retained the same general principles of operation and construction as the one perfected by S. Robishaw. Continuing his father's pattern, Earl Robishaw noted from many operations that when the old tool milled off-center a greater rate of milling and full use of the knives were obtained. By addition of a guide rib, which actually threw the mill off-center, and longer, heavier knives, Robishaw's ideas jelled into what is now called the Eccentric Guide Casing Mill.

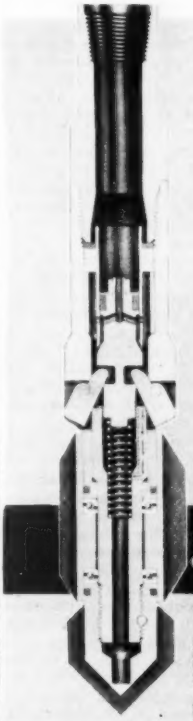
From its first tests in September, 1949, on N-80 grade casing, the Eccentric Guide Casing Mill has proved Earl Robishaw correct by increasing the mill's efficiency 100% (sic.). The new mill has now been adopted as tested and proven, but even today new features are being worked out which indicate higher milling rates than ever thought possible.

Operation

In operation the present Eccentric Guide Casing Mill is lowered through the casing to the highest point where open hole is desired. Slow rotation is started and pump pressure is gradually applied. A piston centered in the tool partially restricts circulation. The resulting hydraulic pressure acts on the piston which in turn forces a set of knives to expand upward and outward at the same time. Each knife, working as a lever on a pin, is formed to expand against the casing, cutting it out. When the knives have cut completely through the casing, the piston reaches its limit of travel, exposing circulating ports for free circulation. Constant weight, rotary speed, and pump pressures are maintained according to the grade of pipe, and milling is continued until the desired section is removed. When completed, the knives automatically collapse as they contact the casing at the top of the milled out section.

This operation is offered domestically on a job service basis by the A-1 Bit & Tool Company of Houston, Texas. Operators with years of drilling experience take complete charge of the job. So positive are results that on sidetracking jobs A-1 makes a guarantee of "no window no pay." Specifications, brochures, and additional information may be obtained from the company's Houston office or from one of its many service points. (Advertisement)

the Eccentric Guide is **EXCEPTIONAL!**



Introduced in 1949 with larger knives and a guide rib causing the path of rotation to be off-center, the Eccentric Guide Casing Mill cuts with a sawing action. It has shown a 100% improvement over the old Multi-Knife mill: A higher milling rate is obtained by the sawing action plus three times more use out of each knife.

ECCENTRIC ROTATION

Bottom view of new mill in action showing path of rotation off-center.

A typical dull knife from new mill. Note full use of heavier knife.

2000 HUSSION STREET BOX 2133
CHarter 7611 HOUSTON

A-1

Export Representatives:

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20 Copthall Ave.
London E.C. 2
England

circulation material and additional oil are added to lighten the mud to as low was 7.5 lb. per gal. As high as 75 per cent oil has been used. The water loss is reduced to 10 cc. or less and the viscosity increased to 50 seconds or above before running the liner.

In wells where a salt string is not used, the foregoing program is employed to a depth of 4,000 ft. At this point the pits are jetted clean of all cuttings and oil is added to the remaining mud, reducing the weight to approximately 9 lb. per gal. Salt jel is also added along with a small treatment of starch or soda ash to aid in emulsifying the oil and water. Strictly speaking, the mud is not a true emulsion as free oil will break out if the mud is allowed to stand idle in the pits. However, the oil serves its sole purpose in reducing the weight of the circulating fluid. Upon reaching the casing point, the mud is conditioned as above, prior to running the long string.

Mud bills, excluding the cost of crude oil, range from $500 to $2,000 in wells where a salt string is used, and from $1,000 to $10,000 for wells using the two-string casing program. Average mud costs are $1,500 and $4,500, respectively, for the two programs with these values increasing in proportion with the amount of lost circulation encountered.

Drilling-In Practice

Upon cementing the long string or liner above the top of the pay, the Spraberry sand is drilled with either rotary tools, using conventional or reverse circulation, or cable tools. Standard practice is to use crude oil as the circulating fluid while drilling in. This is done in an attempt to minimize the amount of damage to pay during the completion operation.

Depth of penetration depends upon the individual operator. Many wells are currently being completed in only the upper portion (60 to 90 ft.) of the upper Spraberry, which has an overall thickness of approximately 210 ft. Initial potential tests of these wells compare favorably with those which open the full section for production.

Fig. 2 reflects the most common types of completion. There are also a few wells producing from perforations, but these are usually wells which were plugged back after testing a deeper zone.

Although cable-tool penetration rates are much slower than rotary-tool rates, many operators believe that less damage will occur to pay when this drilling-in practice is employed. Wells in which the interval from the casing seat through the entire upper Spraberry is drilled, required approximately 30 days to cable tool as compared to 4 days using rotary tools.

It is difficult to evaluate the merits of either rotary or cable-tool completions due to the relatively short producing history of Spraberry wells. As the initial potential tests were taken on various choke sizes and the testing procedure is nonuniform for all operators, it is not considered practical to use these tests as criteria to determine the superiority of either type of drilling-in practice.

Air Drilling

Another drilling-in procedure which has been used in an effort to afford the advantages of cable-tool drilling at rotary penetration rates is that of air drilling. This technique replaces the circulating media with compressed air.

At the present time, this practice has been used to drill the Spraberry sand in two wells by Penntex Oil Co. and Wilshire Oil Co. The first attempt resulted in drilling 922 ft. of formation which proved to be barren. The first 48 ft. of formation which is below the 7-in. casing at 6,620 ft. was drilled by conventional circulation. A penetration rate of 5½ ft. per hour was attained by applying only 4,000 to 6,000 lb. of weight and rotating 35 to 40 r.p.m. Returns at the surface were in the form of dust and were of no value from the standpoint of geologists' analysis. It also appeared that the hole was not being properly cleaned, as considerable dragging was noted when pulling the bit.

The remaining 874 ft. was drilled by reverse circulation which proved to be much more satisfactory in cleaning the hole and the recovery of formation samples suitable for examination. Air circulation proved particularly conducive to cleaning out after shooting this well. An interval of 100 ft. was cleaned out in 6½ hours following a selective shot of 100 qt. of liquid nitroglycerin. Large particles of the bomb and shell case, along with formation fragments and shot gravel, were lifted by reverse circulation.

The Wilshire experiment successfully drilled 108 ft. of formation below the oil string. During drilling operations, oil was continuously jetted at the rate of approximately 10 bbl. per hour from 7,185 to 7,198 ft. The first 81 ft. of formation was drilled below the casing shoe at a penetration rate of 9 ft. per hour using reverse circulation.

The bit was pulled for inspection after drilling the 81 ft. and was found to be in fairly good condition. No abnormal wear appeared to have occurred in the bearings as one would have expected. The second bit cut 19 ft. in 2 hours before plugging. Upon pulling this bit, two stands of oil were recovered indicating that the plugging difficulties resulted from this initial fluid. Another bit was run, but became plugged before any additional hole could be made. A skirted bit made 8 ft. of hole in 2 hours before the casing collapsed causing a twist-off. The use of compressed air was discontinued after the hole was filled with oil for milling operations.

In weighing the different problems encountered during these two experimental operations, the plugging tendency of the bit and drill collars has caused the greatest concern. The task of unloading the fluid that entered the hole while making a trip was solved by installing three conventional pressure flow valves below 5,000 ft. These valves set at opening pressures of 550, 525, and 515 psi., respectively, were able to unload a 2,100-ft. oil column in 3 hours from a depth of 7,200 ft.

The surface equipment for both operations was very similar. Fig. 3 is a schematic drawing of the surface equipment used on the latest experiment.

This system is designed to furnish from 1 to 1½ M.M.c.f. per day at a maximum pressure of 600 psig. Normal drilling operations are carried on with a circulating pressure of approximately 200 - 250 psig.

Some concern has been voiced as to the hazards involved in drilling a hydrocarbon-bearing reservoir with air. An insurance company assured Wilshire Oil Co. that the use of compressed air presented no greater danger, in its opinion, than the use of oil. As a precautionary measure against igniting the discharge oil spray, floodlights were mounted around the rig at a distance of 100 ft., allowing all rig lights to be extinguished, and the well effluent was directed into an open vessel approximately 500 ft. from the rig.

Completion Technique

Most of the operators in the Spraberry trend are using one or more of the following open-hole completion techniques:

1. Drill 20 to 125 ft. of pay with either conventional or reverse circulation, and Hydrafrac in one stage.
2. Drill 20 to 125 ft. into the pay with cable tools, and Hydrafrac in one stage.
3. Drill entire upper Spraberry with either conventional or reverse circulation, and selectivity Hydrafrac from four to seven sections using the straddle packer.
4. Drill entire upper Spraberry with conventional or reverse circulation, and shoot the open hole with from 2 to 4 qt. of nitroglycerin per foot.
5. Cable-tool drill the entire upper Spraberry, and selectively Hydrafrac four intervals with a straddle packer.
6. Set pipe above the upper pay, and complete both the upper and lower Spraberry sands by selectively Hydrafracing each zone.
7. Set pipe through upper Spraberry and complete, using one of the foregoing practices in the lower Spraberry.

Data available on 582 wells which were completed as of October 1, 1951, revealed that by far the majority of operators are using the first-named

(Continued on page 95)

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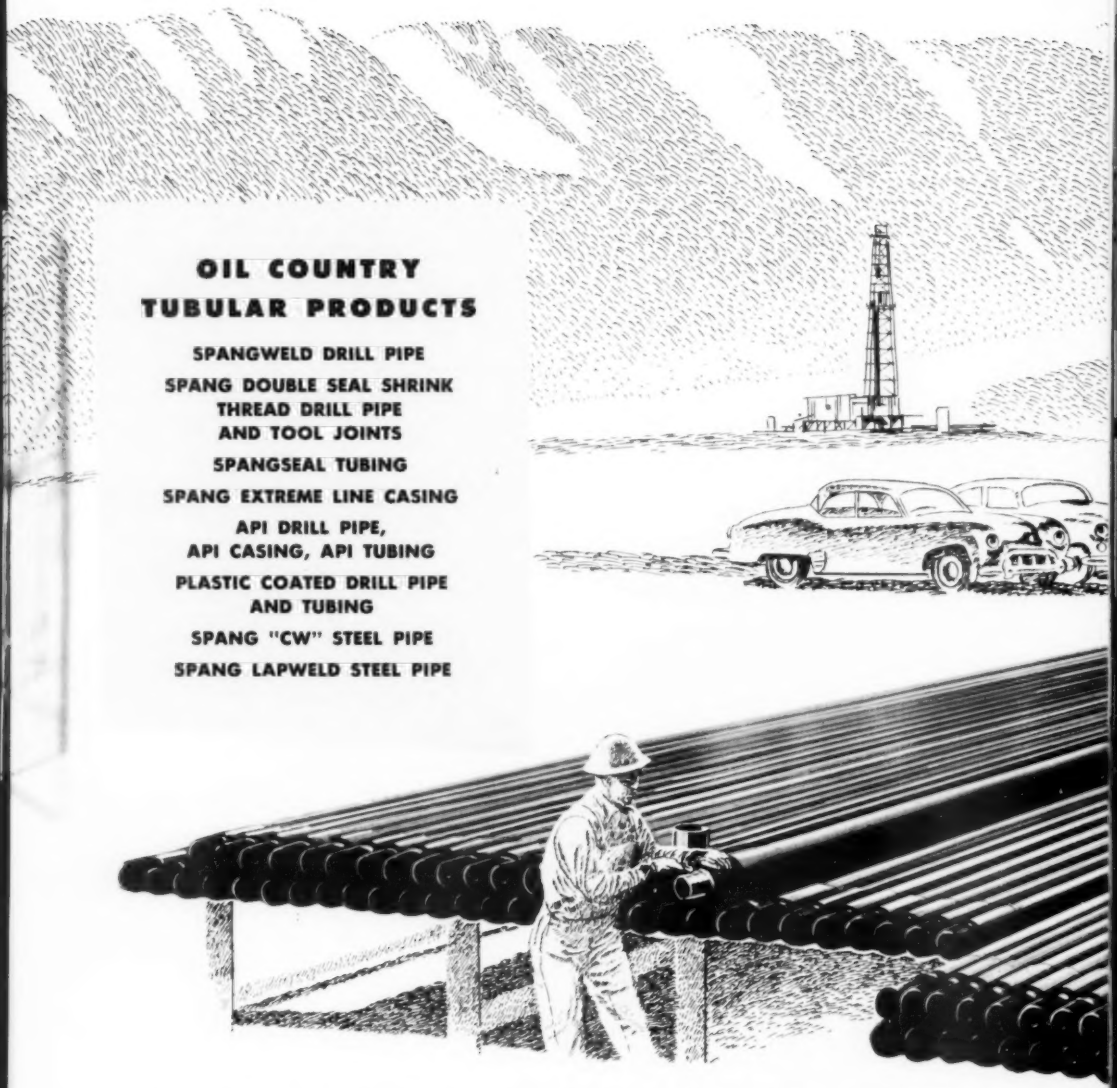

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completion practice (drilling only a portion of the way into the upper pay and Hydrafracing with a single storage).

There is a question, however, regarding the ultimate recovery of wells producing from only a portion of the upper pay. In some wells completed in this manner, the pressure-production decline curves reflect a steeper decline rate than wells which were completed through the entire upper Spraberry. This would indicate that the vertical fractures existing in the pay interval are not continuous throughout the section, and that wells completed in only the upper portion of the sand will not effectively drain the reservoir.

Over-all, 477 (or 82 per cent) of the 582 wells completed as of October 1, 1951, were Hydrafraced and yielded an average initial potential of 325 bbl. of oil per day.

A total of 94 (or 16 per cent) of the wells were shot and yielded an average initial potential of 263 bbl. of oil per day. This latter figure is misleading in that these wells were still producing load oil during the test period.

Acid alone has been used in five wells during the initial completion and yielded an average initial potential of 124 bbl. of oil per day.

Also, five wells were completed naturally for an average initial potential of 304 bbl. per day.

A total of 551 (or 94.8 per cent) of the wells are open-hole completions.

The majority of the perforation completions are a result of plug-back operations after a deeper zone was tested and found to be barren.

Approximately 2 per cent of the wells were completed through both zones. Of these, some have been plugged back and are now producing from the upper Spraberry only.

Approximately 5 per cent (29 wells) producing from the lower pay yielded average initial potential of 187 bbl. per day.

Cable-tool completions appear to result in good producers, but the extended completion period has discouraged many operators from using this technique.

Special Equipment

Extended cleanout periods ranging up to 30 days have been noted after shooting wells with nitroglycerin. This, coupled with the loss of from 2,000 to 3,000 bbl. of crude oil to the formation during the cleanout operation, has discouraged the widespread use of this completion practice.

Difficulty is often experienced in maintaining circulation while drilling weak formations below 4,300 ft. A tool recently introduced and gaining popularity in controlling this problem is the fluid control and jet sub. Three or four of these subs, when employed in the string of drill pipe, aid in maintaining circulation in a conventional manner while drilling a weak formation or cleaning out after shooting with a minimum loss of circulating oil. (One operator using this, cleaned out in only 2 days after shooting the entire upper Spraberry with 4 qt. of nitroglycerin per foot).

Numerous operators have successfully used these subs to regain circulation while drilling weak formations.

A cutaway diagram of one of the subs is shown in Fig. 4. As stated previously, under normal operations, less than 500-psi. pump pressure is maintained below 4,000 ft. The fluid control and jet sub permit pump pressures in excess of 1,000 psi. to be used without exerting great pressures against the formation being drilled. As low pump pressures are applied, the fluid circulates conventionally through the bit only. However, as greater pressures are applied, the 100-psi. spring is collapsed, permitting the piston to move downward, opening two ¼-in. jet tubes which discharge the circulating fluid in an upward direction. In the event the bit becomes plugged, the pressure equalizes above and below the sub, allowing the piston to return to normal position thereby closing off the jet tubes.

Plugged-bit troubles have been greatly relieved while drilling or cleaning out with reverse circulation by the use of skirted bits. These are regular rock bits with a restriction welded over the discharge ports, allowing only small cuttings to enter the drill pipe.

Acknowledgment

Acknowledgment is hereby given to D. V. Carter, C. H. Hudson, F. S. Wright, Jr., R. W. Lewis, and O. J. Ford, Jr., of Magnolia Petroleum Co. for their assistances in preparing this paper. Acknowledgment is also given to all operators in the Spraberry area, particularly Wilshire Oil Co., for their cooperation in submitting and releasing data regarding drilling and completion practices in the Spraberry trend.

Sulfur From H_2S

(Continued from page 85)

a process led to the development of the Girbotol (H_2S extraction) by Girdler Corp. Its efficiency and ability to purify extremely sour gas was proven at McKamie, Ark., through the operation of a pilot plant by Girdler. Since the gas contained approximately 8 per cent H_2S and existed in large reserves, recovery of sulfur was investigated during the pilot-plant run by Girdler.

The hydrogen sulfide obtained from the Girbotol plant was converted to sulfur in a pilot plant based on the Claus process operated by Texas Gulf Sulphur Co. At the same time Southern Acid & Sulphur Co. operated a pilot plant on the H_2S derived from an existing Girbotol plant at Magnolia, Ark. At the start of plant-scale operations in McKamie field, Sasco contracted with McKamie Gas Cleaning Corp. to process the hydrogen sulfide effluent of the Girbotol plant. This plant, starting operations in 1944, was the beginning of the Claus process in this country.

Fundamentals of Claus Process

Fundamentally the Claus process involves burning one-third of the hydrogen sulfide to form sulfur dioxide. The sulfur dioxide is reacted with the unburned H_2S in the presence of a surface-active catalyst (such as bauxite) at about 600° F., to form sulfur and water vapor. The sulfur is condensed to the liquid form and pumped to storage or to tank cars for shipment, or to a storage space where it is allowed to solidify and thereafter handled as a solid.

In these fundamental operations there are several variations in practice:

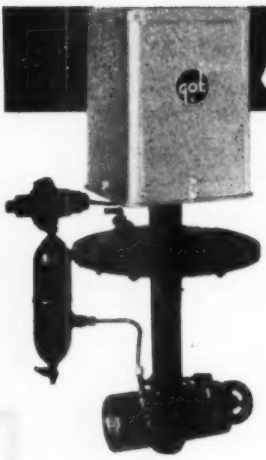
1. **Combustion of H_2S.**—This operation may be carried out by either passing all of the H_2S into the combustion chamber with the calculated amount of air to oxidize one-third of the H_2S, or by splitting the H_2S stream before it enters the combustion chamber. Since the products of combustion H_2S will reach a temperature of 1,900° F., additional cooling is necessary over that obtained from the two-thirds unburned H_2S. This cooling is obtained by two methods. In some plants the sulfur is burned directly in a fire-tube boiler; in others it is burned in a refactory-lined combustion chamber, and the flue gases cooled by passing them through a waste heat boiler.

2. **Reaction of H_2S and SO_2.**—This operation is fairly uniform in the various plants. Though several catalysts of sufficient surface activity can be used, activated bauxite is the most common as it is durable and inexpensive.

3. **Condensation of sulfur vapors.**—This operation is carried out by several methods. The sulfur can be condensed by a waste-heat boiler-type condenser, by air-cooled condensers, or by contacting with molten sulfur in a packed tower. The stream of molten sulfur must be cooled in this operation and this may be done in conventional shell-and-tube coolers or submerged coils.

Yields and Process Methods

This first series of reactions—combustion, conversion and condensation—under proper conditions will result in a yield of 80-85 per cent. By reheating the off gases from condensation by means of a heat exchanger or in a line heater and subjecting them to another conversion step and condensation, this yield is increased to 90 - 95 per cent. All but one of the plants now in operation are of sufficient capacity to justify this increased investment. In cases where



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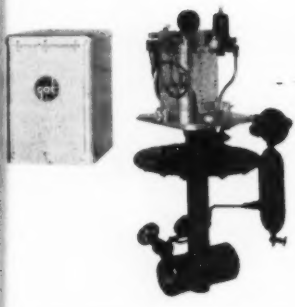

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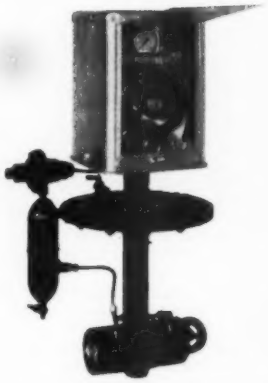

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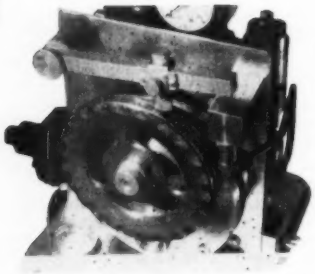

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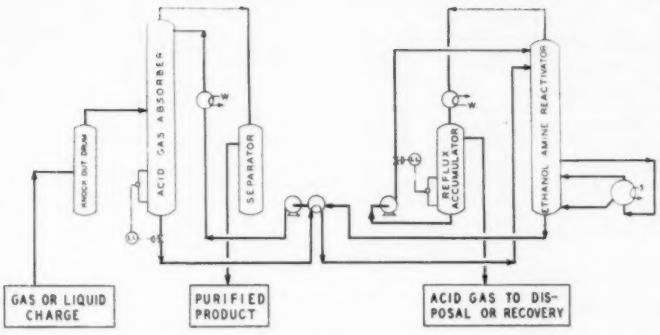


Flow scheme of Girbotol process for removal of H_2S from natural gas or liquids.

there are 15 tons or less per day available, it would probably be more economical to use only a single-stage plant.

In some cases hydrogen sulfide is accompanied by carbon dioxide, resulting in design difficulties. Occasionally, CO_2 is present to such an extent that the gas stream will not support combustion. In some cases this problem can be handled by selective reactivation of the amine solution in the Girbotol plant, as developed by Girdler. In this way the H_2S concentration can be increased sufficiently to support combustion.

Girdler has also developed a method of burning a sufficient amount of the product sulfur to form the theoretical quantity of SO_2 to react with the H_2S present in the acid gas stream. This eliminates the necessity of burning the stream.

Another method is to add sufficient natural gas to increase the B.t.u. content of stream to the point that it can support combustion. This method has the disadvantage of increasing the size of the plant equipment and consequently the investment. In addition, the combustion of natural gas increases the water-vapor concentration which lowers the conversion efficiency.

The design fundamentals in a Claus type sulfur-recovery plant are not complicated and are quite familiar to the average process engineer. However, to obtain a plant of maximum efficiency a certain amount of know-how is necessary which can be obtained only by experience. The design of the boiler, condensers and interstage heaters is conventional. The design of the converter varies from plant to plant with space velocities going as high as 200 based on the hydrogen sulfide being processed.

Care must be taken to provide sufficient drains at all points where there is the possibility of sulfur condensation, and all lines should be sloped so that they will drain during a shutdown. All lines handling molten sulfur should be steam jacketed.

Material of construction varies. In general, carbon steel is satisfactory for the boiler. Lines and equipment from the boiler through the converter should either be insulated with high-temperature cement or fabricated from high-temperature alloys.

Sulfur Plant Operations

Operation of the plant is not complicated. For optimum efficiency the H_2S-air ratio and the H_2S-SO_2 ratio should be carefully controlled. The results of the controls can be checked by analysis of the tail gas for H_2S, SO_2 and O_2. Normally, the ratio of H_2S to SO_2 in the tail gas is the same as the ratio at which they enter the converter.

The main operating difficulties encountered result from gases other than H_2S in the original stream. Carbon dioxide present in the original gas stream or formed from the combustion of any hydrocarbons present will react with H_2S to form carbonyl sulfide. The decomposition of this compound requires higher temperatures than the reaction of H_2S and SO_2 to form sulfur. This difficulty can be eliminated by operating the first converter at a higher temperature (at about 750° F.) than the second converter.

Refinery gases frequently contain other impurities which either lower the yield of the plant or result in the formation of carbon on the bauxite catalyst. The problems encountered are not too difficult to eliminate.

The question of the type of sulfur that is produced from these plants is encountered frequently. The sulfur produced is the same as that which is produced from the mines, namely rhombic which at room temperature is the stable form of sulfur.

At 200° F. sulfur changes to the monoclinic form, then melts at 239° F. Molten sulfur is a free-flowing liquid until its temperature is increased to 320° F. when the viscosity suddenly increases to where it is quite viscous. The less-viscous sulfur is considered to exist as an eight-membered ring while the viscous material exists as a long chain of sulfur atoms.

The sulfur produced from these Claus-type plants is purer than mined sulfur. It can be burned to ash by ignition whereas mined sulfur must be continually agitated so that it will maintain combustion.

The above properties show that the following operating temperatures are necessary. For condensing the sulfur vapor from the converter, the sulfur must be cooled to 270°-300° F. This temperature must be maintained in lines conveying molten sulfur and in any liquid storage through the use of steam jacketing or steam coils using 30-psig. stem.

Product sulfur can be handled in several ways. The most economical, especially for small plants, is to maintain a liquid storage and ship it either in tank cars or trucks. If solid sulfur is desired and space is available, the molten sulfur is pumped to storage and allowed to solidify. More complicated methods have been used such as cooling the molten sulfur on a moving steel belt. As the belt turns the solidified sulfur will flake off and can be stored and loaded from an elevated hopper.

The decision to build a sulfur plant involves many details. Location of the plant and point of use of the sulfur should be considered. In some cases, the sulfur is more valuable to the producer than the market price and in some cases, it is necessary to utilize the H_2S due to local ordinances. The above cost calculations indicate that a production of 5 long tons per day is the minimum that should be considered on a conservative basis.

1. Author's note: Hydrogen sulfide is almost as toxic as hydrogen cyanide. Many, familiar with the odor, minimize its danger not realizing that in fatal concentrations it paralyzes the olfactory nerves and one is not aware of the danger until it is too late. We all know of casualties resulting from hydrogen sulfide and its deadliness cannot be overemphasized.

The disposal of H_2S by complete combustion to SO_2 presents problems. Although SO_2 is poisonous, it is not as dangerous as H_2S which due to its irritant qualities causes one to leave the vicinity before a toxic concentration is reached. However, SO_2 is a nuisance-forming smog in some localities and causes crop damage in others. The prime example of the latter was the widespread damage resulting from the smelter at Trail, B. C., resulting in an international tribunal with large awards to the owners of the damaged crops.

2. "Sulfuric Acid Regeneration at Cities Service Refinery," by George Weber, The Oil and Gas Journal, November 15, 1951, page 134.

BOOK

AS YOU PASS BY. By Kenneth Holcomb Dunshee. Published by Hastings House, New York. 275 pp. $10.

This is a tale of New York that was—its citizens, its fire houses and firemen, its vanished neighborhoods and towns, its water courses and streets—all are presented in a story of the past that forms a background of the character, appearance, and surge of New York as it is today. The volume is copiously illustrated and is printed in Lithure.

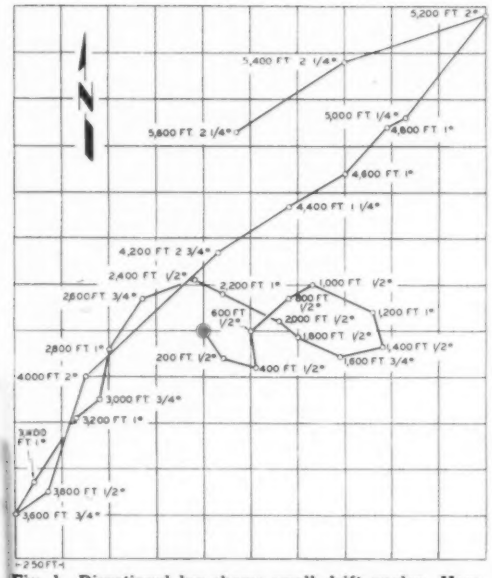


Fig. 1—Directional log shows small drift angles. However, difficulties were experienced due to frequent horizontal direction changes.

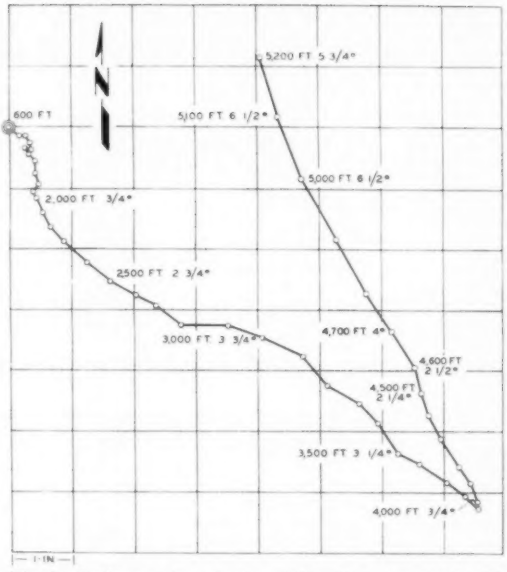


Fig. 2—Drilling and production difficulties occurred in this well at depth of 3,900 ft., due to sudden change in horizontal direction.

WANTED:

A Definition of a Crooked Hole

by R. B. McCloy*

THE deviation clause as now used in drilling contracts by the oil industry does not assure a particular type hole or even one that is relatively free from drilling and producing difficulties.

If frequent changes in direction of drilling are avoided, drift angles may safely exceed those presently considered maximum.

When frequent changes in direction of drilling occur, drilling and production difficulties will occur even though drift angles are within the allowable range.

The deviation clause in use by most operators may assume one of several commonly used forms, three of which are shown in the separate tabulation.

Most contracts provide, either in the deviation clause or elsewhere in the contract, that if the hole deviates more than the allowed number of degrees, the contractor shall at his expense plug back and redrill the hole within the allowable deviation. Of course, there is no assurance that plugging back and redrilling of itself

*Stanolind Oil & Gas Co., Oklahoma City. Presented at A.P.I. Division of Production meetings, Shreveport, La., and Wichita, Kans.

Types of Deviation Clauses in Drilling Contracts

Type 1.—Contractor agrees to prosecute the drilling of said well with due diligence and in accordance with the usages and customs of skillful contractors; to make every effort to drill a straight hole and to make or allow the company to make slope tests as frequently and at such intervals as company deems advisable to determine whether the slope of the hole or the angle of its course from vertical is within the following allowable limits:

2 to 1,000-ft. depths;
3 from 1,000 to 3,000-ft. depths;
4 from 3,000 to 4,500-ft. depths; and
5 below 4,500-ft.;

but in no case is a greater slope to be permitted than the maximum allowed by state regulatory bodies or officials having jurisdiction of such matters in case an allowable slope has been prescribed for the locality or field in which the well is to be drilled. If it is found that the slope of the well is beyond the prescribed allowable limits, contractor, at its own expense, agrees to cement off, redrill, or straighten the course of the hole so as to satisfy the above specifications.

Type 2.—Contractor agrees to drill said hole reasonably vertical from top to bottom thereof to satisfaction of company. Test said hole for deviation from the vertical each 400 ft. and at such other points as may be required by company at contractor's expense, by use of a method approved by company. When any such test shows a greater deviation from vertical than ( ) degrees contractor shall, at contractor's expense, redrill the hole and thereby reduce such deviation from the vertical to a degree acceptable to company.

Type 3.—The contractor assures company a good, clean, straight hole, which shall not deviate more than ( ) degrees from vertical at any point in its course. All surveying shall be done at contractor's risk and expense with an instrument approved by the company, and at intervals to be designated by the company, but in no event at greater intervals than 500 ft. The contractor shall furnish the company with the original record, instrument reading, or correctly labeled acid bottle of each survey. Contractor shall show the result of each survey on the daily progress report. The company reserves the right to survey the hole with its own equipment at any time during the course of the drilling operation.

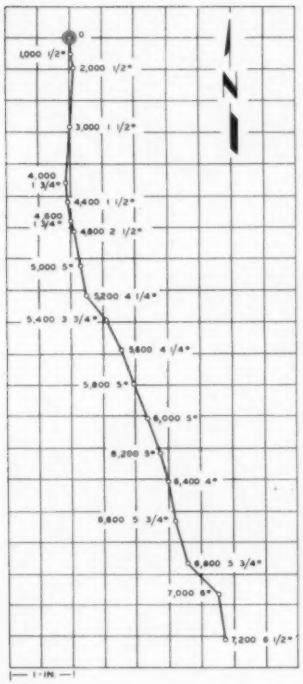


Fig. 3—Drift angle exceeds 5° in this directional log. No unusual drilling and production difficulties resulted, since horizontal direction changes are small.

will yield any better results than that obtained in the original hole.

Early Attention to Deviation

The deviation clause had its inception just prior to 1930. The clause resulted from the introduction of equipment and methods to measure vertical deviation. The most popular equipment for measuring deviation was the acid bottle, although electrical and various compass arrangements were used. The use of this equipment indicated that deviations of 20° to 30° were recorded in wells that had been assumed to be vertical. The discovery of this deviation was of great concern to operators due to misinterpretation of geological data, well spacing, and extra contract cost of the deeper deviated hole as compared to a shallower vertical hole.

In an attempt to remedy this situation, operators instituted the deviation clause in the drilling contract. A typical deviation clause in use in 1929 was quoted by Frederic H. Lahee in his A.A.P.G. paper, "Problem of Crooked Holes," read before the association on March 23, 1929.

In this paper it was noted that the allowed deviation was 15°. At the time, improved rock bits and drill collars were not in use. Advances in the art of drilling between 1930 and 1940 made it possible to drill wells with vertical deviations under 5° so that an allowable deviation of 3° came into common use. This deviation clause did not cause undue hardship in drilling operations so little was said or done about vertical deviation until recent years. The advent of heavy-weight drilling and activity in geologic provinces of intense folding has again focused attention on the deviation clause.

With the change in drilling practices, areas of activity, and the development and common use of improved well-survey instruments, application of the deviation clause has again come into prominence. The main point of concern at the present time is the increased drilling cost resulting from attempting to stay within the drift angle of 3° to 5° normally specified. General disapproval of the drilling contract deviation clause results from the fact that drift angle alone takes no cognizance of rate of change of drift or direction of drift, but defines only the angle from the vertical. It is known that control of drift angle alone does not assure any particular type or pattern of hole and will not of itself assure relatively trouble free drilling or producing operations.

Drift Angle Limitations

To clarify the limitations of specifying drift angle alone, consider the directional logs presented in Figs. 1 and 3. These logs are typical of wells drilled in the Mid-Continent area and are normally drilled wells with no directional-drilling techniques employed.

A directional log of a well drilled in Stephens County, Oklahoma, is shown in Fig. 1. This well was drilled in accordance with a contract deviation clause permitting 3° vertical deviation. The directional survey was plotted from readings taken every 200 ft., and single-shot readings taken while drilling are noted along the course of the directional log. To those not familiar with directional logs, this figure represents the course of the bore hole as observed by projection on a surface horizontal to the derrick floor. To obtain a true picture, the figure must be visualized in three dimensions as the well bore actually occurs.

On this log, only one reading is as great as 2¾°; the rest are practically all 2° or less; yet, observe the many changes in direction and rapid changes in vertical angle that represent real drilling hazards and later production expense. While drilling, the radical changes of direction will cause keyseats if the rocks are not sufficiently hard and the depth is appreciable. If the rocks are too hard to permit keyseating, then excessive drill-pipe wear will be experienced. In producing operations, appreciable rod and tubing wear at the points of rapid change of direction must be the result.

Fig. 3 is the directional log of another typical well drilled in Stephens County, Oklahoma. Again, the log was plotted from readings taken every 200 ft. and the single-shot readings taken while drilling are noted along the course of the directional log. In the area of this location, it is not difficult to maintain an angle of 3° to 4,500 ft., but below this depth, drilling is especially slow if the angle is held below 5°.

To decrease drilling cost, the wells are contracted to 4,500 ft. with a 3° deviation clause; below 4,500 ft. they are drilled on a day-rate basis and the angle allowed to build up to not over 8°. The log indicates the well to be 1¾° from vertical at 4,600 ft. with the drift angle increasing gradually to 6½° at 7,200 ft. The important feature is that only a slight change of direction occurs between 5,200 and 5,400 ft. and no rapid rate of change of drift angle occurs. This well was drilled with no drilling difficulties, and it is anticipated that producing operations will not be as expensive as the well presented in Fig. 1.

The well presented in Fig. 1 meets current popular drilling contract requirements, whereas the well presented in Fig. 2 does not. From a comparison of these logs, it is obvious that specification of drift angle alone does not obtain the results most operators desire and believe they are providing for when using a deviation clause.

Importance of Direction

Fig. 2 presents the directional log of a well drilled in Kiowa County, Oklahoma. The log of this well is of importance since round-trip difficulty was encountered in a section of the hole where the drift angle was very low, and no difficulty was encountered where the drift angle was relatively high. The drift angle at 3,800 ft. was 2¼°; at 3,900 ft. was 1¾°; and at 4,000 ft. was ¾°. The rate of change of angle is less than 1° per 100 ft., which is low. The important point is the change of direction from southeast to northwest.

The base of a very hard formation occurs at 3,900 ft.; and, on every trip out of the hole, difficulty was encountered in working the drill collars through this section of the hole. Between 4,800 and 5,100 ft., the drift angle increased from 4¼° to 6½° or 2¼°, at a rate not exceeding 1½° per 100 ft., with no change in direction. With this relatively high drift angle no difficulty was encountered coming off bottom until the drill collars were pulled into the section at 3,900 ft. The log of this well is another example that drift angle alone cannot be depended upon to assure a reasonably vertical trouble-free hole.

With regard to money savings, it is agreed that a comparison of well

(Continued on page 110)

PRICE PIPELINE PORTRAITS

R. K. "BOB" SHIVEL Superintendent, Spread 2

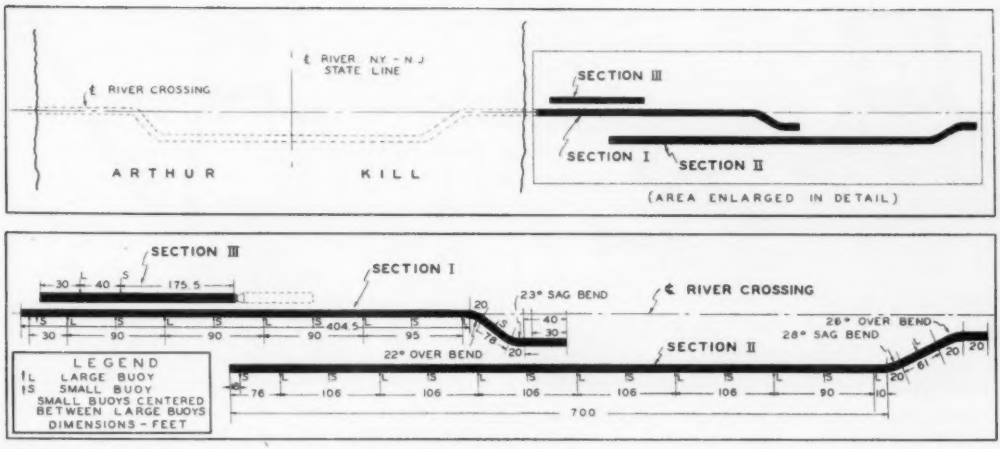
"They can't put a pipeline there," Bob Shivel was told. But as a superintendent on the war-essential 1,700 mile Canol Pipeline in '43 he proved that the "impossible" could be done. In 27 years of pipelining, Shivel has climbed through the ranks: welder helper, welder, foreman and spread superintendent. Married and father of two sons, Bob Shivel knows that when H. C. Price Co. is laying one of America's vital pipelines there are no holidays and no picnics. He's worked in South America's steaming jungles, on the "Biggest Inch" in California's 130° heat, and fought rampaging rivers to stretch the "Toughest Inch" over the precipitous Alleghenies. He, and men like him, are why H. C. Price Co. upholds its reputation as "America's Foremost Pipeline Constructors."

PIPELINE PRICE CONSTRUCTORS

H. C. PRICE CO.

PHILADELPHIA · BARTLESVILLE · NEW ORLEANS

America's Foremost Pipeline Constructors



Diagrams of launching sections of 24-in. Arthur Kill crossing, after they were fabricated on shore before they were moved into the water.

Transco's Deep Marine Crossing at Arthur Kill

Ingenious plan was carried out to effect crossing of one of the world's most heavily trafficked waterways

by Raymond Crowe*

THE rotation of floating, bent sections of 24-in. pipe from a horizontal to a vertical position facilitated the laying of Transcontinental Gas Pipe Line Corp.'s deep marine crossing at Arthur Kill. This rotation was accomplished by the removal of pontoons. By utilizing this procedure it was possible to follow a plan for installation which achieved substantial economies.

Since the Arthur Kill between New Jersey and Staten Island is one of the busiest waterways in the world, the company had to work so that marine traffic would be interrupted only a few hours. The undertaking consisted of laying 1,577 ft. of 24-in. Somastic-coated and Hevicote concrete-jacketed pipe for gas transmission at a minimum depth of 47 ft. below mean low water.

By fabricating the pipe with sharp bends the crossing was built so as to eliminate expensive trenching in the solid rock bottom of the stream. Such additional trenching would have materially increased the cost of the project. Rotation of the floating bent sections was essential for precise installation. Due to the extreme weight of the pipe, added buoyancy was necessary to reduce pulling power.

Pipe and coating dimensions.—Pipe is 24-in. diameter, ½-in. wall; Somastic coating $\frac{5}{8}$ in. thick; Hevicote concrete jacketing 3 in. thick; total diameter of coated and jacketed pipe, 31¼ in. The smooth, symmetrical surface of the concrete avoided structural stresses and facilitated the lining up and launching on rollers. Consequently it contributed much to the success of the project. Coating and jacketing were applied at a plant of H. C. Price Co. at Howland Hook, Staten Island.

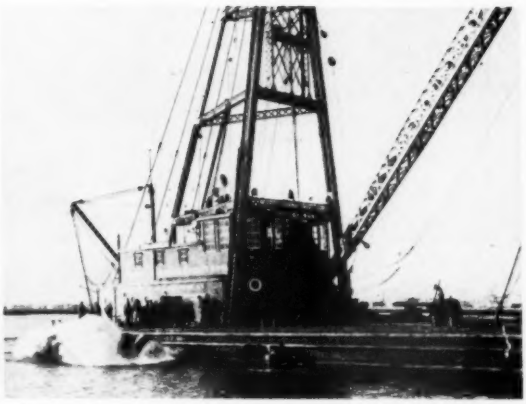
The lengths of the three fabricated sections were as follows: No. 1, 560 ft.; No. 2, 820 ft., and No. 3, 197 ft. The drops from overbends to sags are 38 ft. in Section 1 and 40 ft. in Section 2.

Bends to fit the trench in the deep

*Chief Engineer Transcontinental Gas Pipe Line Corp.

Sections of 24-in. pipe with pontoons attached preparatory to launching.

Floating crane raises bent section prior to lining up with next section.



A large pontoon surfacing after being released from 1,577-ft. crossing section.

channel are as follows: New Jersey side, overbend 22°; sag bend 23°. Staten Island side overbend 26°; sag bend 28°. Bending was done on a table in a local shop by conventional hot-bending methods.

Launching of coated and jacketed sections No. 1 and No. 2 was done on rollers, instead of the conventional railroad. Section No. 3 was picked up and carried.

The launching rollers were furnished by Collins Construction Co. and were rubber coated to avoid coating damage.

Pontoons of the two sizes used were of the following dimensions: Large pontoons, 20 ft. long and 5 ft. in diameter had 21,600 lb. lifting force; small pontoons 6 ft. long and 3 ft. in diameter had 2,600 lb. lifting force.

Large pontoons were held to the pipe by eight high-tensile-steel straps; small pontoons by two straps. These straps were threaded through a releasing mechanism designed to facilitate releasing operations. This flotation equipment was designed by Sammy Collins of Collins Construction Co. and the equipment was rented for the project.

Launching and Installation

The step-by-step procedure for launching and installation was as follows:

December 11.—Section 1 was pulled out to the channel line, leaving one end on shore where it could be welded to Section 2. Welding, priming, and coating in this connection took 4 hours.

While floating horizontally, the first section was held by an anchored barge. Since the end did not extend into the channel, there was no interruption of marine traffic in the Kill. Therefore the channel was open during the entire day and night of December 11.

December 12. — The channel was closed for marine traffic from 8:00 a.m. to 12:45 p.m. Slack high tide occurred at 7:30 a.m. Patrol boats were useed to control traffic and records were kept of the boats stopped, for future reference. The fabricated pipe section was pulled across the channel to a floating position over the predetermined location in the trench. While floating horizontally, the pipe with pontoons had a positive buoyancy of 14 lb. per lineal foot.

Rotating of the section from horizontal to vertical position was done by removing seven small pontoons and two large pontoons, which resulted in a negative buoyancy of 6 lb. per lineal foot, causing the pipe to rotate and submerge into the dredge ditch.

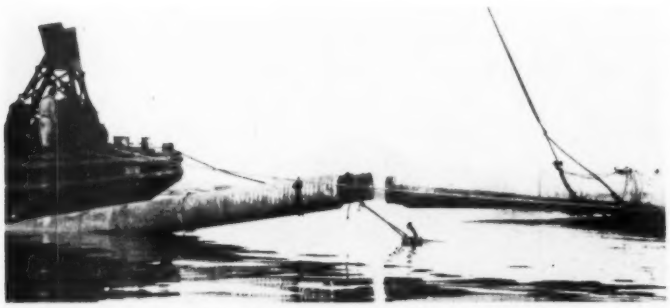
After the pipe had been rotated and lowered so that traffic could be resumed an inspection by a diver was made to determine if the line was in the deepest part of the ditch. It was found that the line should be moved approximately 5 ft. upstream, on the New Jersey side. Since most of the pontoons were still attached and the pipe comparatively light this easily could be done.

December 13. — A tugboat (tender of the 90-ton derrick barge "Colossus") pulled the Jersey side into the deepest part of the trench. When actually installed the pipe line was 48.9 ft. below mean low water in the deep part of the channel where U. S. Engineers required a depth of at least 47 ft.

At noon the diver reported the sags were correctly placed. Engineers ran spot checks before removal of the remaining seven large and two small pontoons to give a final negative buoyancy of 203 lb. per lineal foot for the air-filled line in 63.5-lb. per cubic foot fluid or a 62-lb. per lineal foot in 90-lb. per cubic foot heavily silted salt water characteristic of the channel bottom. The weight of the coated and jacketed pipe in the air was 563 lb. per lineal foot.

December 14. — Section No. 3 was welded to the line. The derrick barge picked up and held the end of the river pipe while tractors pushed out Section No. 3, (197 ft. long) to the barge. The barge held Section No. 3 in alignment by means of one of its several auxiliary falls. A drag line

(Continued on page 113)



Coated and concrete-jacketed pipe ends in the process of being lined up for welding. After welding, coating and concrete were applied to cover bare space at the ends of the joints.

Temperature Controller

Device automatically stops flow of gas to heater burners, thus eliminating hazard of rupturing tubes, serious fire

WHEN oil flow through Alcorn or petrochem-type direct-fired heaters stops abruptly, excessively high pressures and temperatures are created within the tubes unless the fire is immediately extinguished in the fire box.

W. A. Allexson, assistant superintendent of Shell Oil Co.'s Notrees, Tex., plant, has perfected a device which automatically stops the flow of gas to the heater burners. Thus the hazard of rupturing tubes and thereby starting a serious oil fire is greatly reduced.

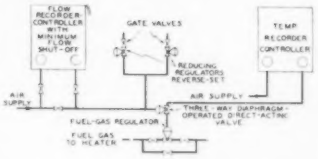
Allexson presented his idea to the "Operating Kinks" forum at the recent Permian basin regional meeting of Natural Gasoline Association of America at Odessa, Tex.

Description.—A sketch of the apparatus is shown on the accompanying diagram. The original installation on the heaters consisted of a discharge oil-temperature recorder-controller operating the heater fuel-gas regulator and a flow recorder-controller measuring oil flow through the heater. With these instruments in place, it was necessary to buy only a three-way diaphragm-operated direct-acting valve, two reducing regulators, and an on-off control unit for the flow recorder to make the automatic shutdown installation.

The three-way valve was placed in the controlled air line between the temperature instrument and the fuel-gas regulator. The two reducing regulators were reverse-set and installed in parallel in the controlled air line between the flow instrument and three-way valve, exhausting to the atmosphere (see diagram). The on-off control unit was then installed in the flow controller.

Operation.—The index pointer on the flow recorder is set at a point slightly below normal recorded flow. As long as the oil flow remains normal, full instrument air-supply pressure is transmitted by the flow recorder to the three-way diaphragm valve, allowing it to stand open. Controlled air flow from the temperature controller to the fuel-gas regulator is therefore not interrupted.

When oil flow stops, the indicator pen on the flow recorder drops below the index pointer and trips the flapper away from the nozzle. Air pressure then bleeds from the line supplying the three-way valve. The two reducing regulators are set to



open to the atmosphere when line pressure drops to 10 psig.

This provides additional means for venting the controlled air from the line between flow controller and three-way valve to the atmosphere. As the controlled air pressure drops below 10 psig., the three-way valve stops the controlled air flow from the temperature controller to the fuel-gas regulator. Simultaneously a bottom port in the three-way valve is opened and air is vented from the line between this valve and the fuel-gas regulator. The fuel-gas regulator then closes and fire is extinguished in the fire box.

If normal oil flow is reestablished in a short time, the flapper again covers the nozzle and allows controlled air to again flow toward the three-way valve. This air pressure if allowed to build up would open the three-way valve and consequently the fuel-gas regulator. Since it is desirable that the heaters not be fired up until the operator desires, the air pressure is bled off from this line through the two reducing regulators to atmosphere. Caution must be taken to provide sufficient bleed-off capacity to prevent buildup to 10 psig. Should the pressure reach 10 psig., the reducing regulators would close and allow normal controlled air to pass from the flow recorder to the three-way valve.

Two regulators used.—Two reducing regulators are used on the installation at Shell's Notrees plant. In order to place the shut-down device back in operation after normal oil flow is resumed, the plug valve downstream from the fuel-gas regulator and the one on the bypass around this regulator must be in closed position.

The two gate valves downstream from the reducing regulators are manually closed by the operator. This permits controlled air pressure to build up and open the three-way valve, thus allowing the controlled air to flow to the fuel-gas regulator. The plug valve downstream from the regulator is opened and the heaters lighted. Normal service is thus established.

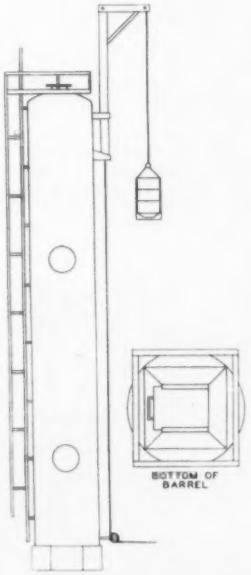
When it becomes necessary to reduce the oil flow to a heater by stopping one of the two pumps in this service, the automatic shutdown mechanism must be taken out of service to prevent completely cutting off the fuel-gas supply to the heater. This may be accomplished by opening the bypass between the air supply and controlled air lines on the flow controller instrument, thereby maintaining the three-way valve in open position.

The Notrees plant has two such automatic shutdown mechanisms in operation on Alcorn heaters and four on petrochem heaters. They have worked perfectly on numerous occasions since installation approximately 1 year ago.

Desiccant Loaded Into Gas Dehydrators by Oil Drum

O. F. Hamilton, gang pusher for Stanolind Oil & Gas Co., Andrews, Tex., has devised a fast, economical method for loading desiccant into gas dehydrators.

The loading apparatus is made from a 55-gal. oil drum. The oil drum is altered by removing the top and providing a sliding trap door in the bottom to facilitate the dumping of desiccant. The bottom of the drum is sloped to allow all of the desiccant to fall through the 10 by 10-in. trap. The



Desiccant loading device.

altered barrel is then placed in a hanger made of 2 by 2 by ¼-in. angle iron and welded into position. A drum rigged in this fashion will hold three 125 lb. sacks of solid desiccant.

The loaded drum is hoisted into dumping position at the top of the tower by means of a cable threaded through the pulleys of a center-haul davit and attached to the frame of a truck. By driving the truck back and forth the loaded drum can be quickly hoisted to the top, dumped and returned to the ground.

Hamilton presented his idea before the "Operating Kinks" session of the Permian basin regional meeting of Natural Gasoline Association of America, at Odessa, Tex.

Gasket Leaks Are Stopped Without Replacing Gaskets

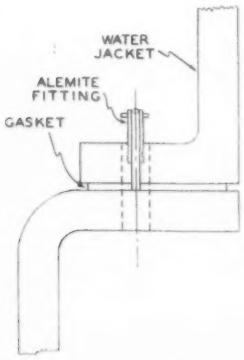
George Needham, engine repairman at the Hobbs, N. M., plant of Phillips Petroleum Co., has perfected a method for stopping gasket leaks without replacing the gasket.

Where a shutdown or considerable time would be required to make repairs, his method is applicable.

A hole is drilled through one flange and into the gasket. The hole is tapped to take an alemite fitting. A grease gun is then loaded with permatex and the permatex is forced into the gasket. The permatex seals the leak.

This method was used to repair a gasket leak between the water jacket and crankcase on an engine. A large stream of water was running through the gasket. To replace the gasket in this case a 5-day shutdown and a labor bill of $600 would would have been required.

By using this method and making two taps the leak was stopped in about 20 minutes and the engine was not shut down. This was done several months ago and to date no further leaking has occurred.



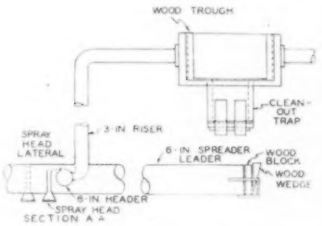
Needham entered his idea in the "Operating Kinks" session of the recent Permian basin regional meeting of the Natural Gasoline Association of America.

Nonclogging Spray Header Designed for Cooling Tower

A new type of nonclogging spray header for cooling-tower operation is in use at the Hobbs, N. M., plant of Phillips Petroleum Co. George Zorns, chief operator, is responsible for its adoption.

Zorns submitted this idea to the "Operating Kinks" session of the recent Permian basin regional meeting of Natural Gasoline Association of America in Odessa, Tex. He won first prize in the "Field Operations" division with this entry.

A great deal of trouble is experienced with clogging due to scale in



cooling-tower operation. The basis for this present system of clogging prevention is that all connections to troughs and headers are made at the top of these conduits.

As shown in the diagrams the individual spray head laterals come off the top of the spray header, and the spray-header feed lines come off the trough as near the top as is practical.

The scale, which settles to the bottom of these carriers, is thus excluded from the smaller piping and may be flushed out periodically.

The ends of the 6-in. headers are closed with redwood blocks held in place by wedges. To clean the headers, the wedges and blocks are removed, and scale is flushed out by flowing water. Likewise, to clean the troughs, clean-out boxes and trough blocks have been set in the tower at every 10 bays. The same flushing procedure is employed.

Previous to the installation of the new system one man was assigned to the tower at all times. This system has now been in operation for 6 months and has yet to require attention.

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Gage Is Developed for Use With Underground Oil Sump

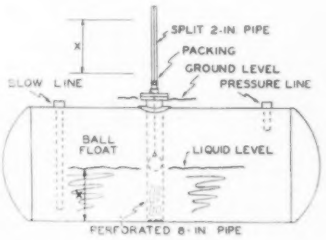
A constantly indicating gage for an underground oil sump is in use at the Crane, Tex., plant of Phillips Petroleum Co.

H. O. True, plant superintendent is responsible for its development.

The gage was made from salvage parts. In its construction an 8-in. pipe was run down to the bottom of the sump and perforated to allow free movement of liquid. A flange was placed on the 8-in. pipe and the pipe was welded to the tank opening with a pad.

A hole was cut in a blind flange to permit passage of the gage rod. A ball float salvaged from a level control was attached to the bottom end of the gage rod. A 2-in. pipe was split in half except where it threaded into the collar welded on the blind flange.

Thus, the ball floats on the liquid in the sump, moving the rod above ground. A seal was accomplished by utilizing a discarded motor-valve packing gland. The accompanying sketch shows the general arrangement of the various parts.



This gaging device has proved successful in use and costs very little to install. It shows an accurate gage during pressure dumping.

True submitted this idea to the "Operating Kinks" section, Permian basin regional meeting, Natural Gasoline Association of America, at Odessa, Tex.

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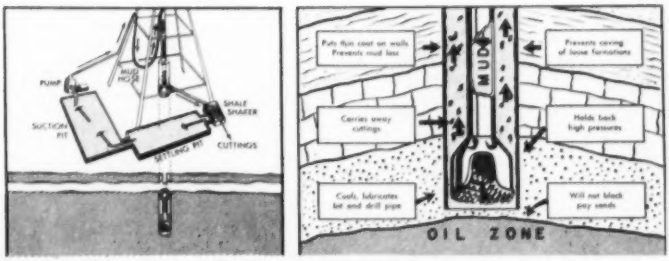


MUD FLOW.—Constant circulation is necessary in rotary drilling. These drawings show route of mud. (Courtesy Stanolind Oil & Gas Co.)

Drilling Mud—A Brief Sketch

MUD is to rotary drilling what blood is to your body.

It includes all types of ingredients, from carbon black to starch to chicken feathers. It is sometimes light, sometimes heavy, and sometimes oily. But no matter what its formula, it is mixed to maintain circulation, cool the drilling bit, and return cuttings to the surface.

First deliberate use of mud as a drilling fluid probably occurred at Spindletop field, Texas, in 1901. Before this drilling venture, water muddied with natural clay cut by the bit was the only drilling fluid.

Treacherous underground quicksand made cave-ins a major source of trouble at Spindletop, so the drillers turned to mud. They plowed up the water pit, drove in a herd of cattle to churn up a gooey mess, and used it in the well.

It worked. Mud plastered the well walls and kept them from caving. From then on, nothing else could suit the driller better than mud.

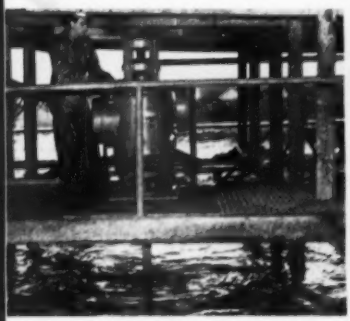
Much research.—But not just "plain" mud. Research has been carried out on thousands of materials as additives for various muds.

The mud engineer now has a choice of many additives to fit any drilling problem, thanks to results of intensive research programs carried on by many companies. He can formulate the best type of mud to combat salt-water entry, heaving beds of shale, high formation pressures, tight or porous clay sands.

How much does this cost? A 12,000-ft. well might use $35,000 worth of mud. On occasion costs may climb to more than $100,000.

MUD HOUSE.—Weighting material is added by Jim Palmer as Lon Biano brings up another 100-lb. sack.

ADDITIVES.—Olin Routh adds lime and caustic soda to immunize mud to effects of salt water. Mud has all-round job in keeping well in good condition.



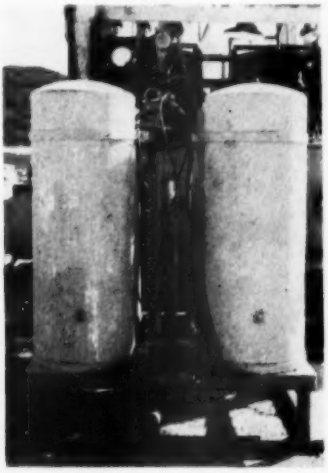
MUD MIXER.—This machine keeps mud agitated as it passes through suction pit. Hector Dugas checks machine.

VISCOSITY TEST.—George Dausch uses stop-watch to determine viscosity of drilling mud. These field tests are important, guard against too-thick mud.

Lube Oil Kept Under Pressure By Drilling Exploration Co.

A set of closed vessels have been adapted by Drilling Exploration Co. for lubricating oil in such a manner that contents are under pressure as long as any oil remains in the containers.

This conversion prevents spills and use of measuring cans and buckets, and delivers the lube oil through oil-proof hose and pipe lines directly to



LUBE DRUMS operate at 25 psig., deliver crank-case oil to drilling and mud-pump engines. Use of open containers and measuring cans is eliminated.

the engines, where makeup can be done by opening a gate valve.

The containers are mounted on a common foundation, banded tightly together, and with a center post. The entire unit can be lifted bodily for moving.

Drums are used exclusively for crank-case oil, and are tied together with a pipe line at the base. Each is fitted with a gage glass to indicate amount of oil it contains.

Only when volume drops far below the amount contained in a conventional shipping drum is fresh oil introduced to the containers. Thus, partially filled drums are eliminated.

Service lines lead directly to the crankcases of the various power units, where spigots are supplied so the mechanic responsible for servicing the engines can instantly refill a low-level crankcase without having to use measuring cans, buckets, and funnel.

Current Interrupter

Instrument used in cathodic protection of lines, tanks

FIELD work incident to design of cathodic-protection units often involves the forced drainage of test currents from the pipe line, tank bottom, or similar structure to be protected.

A source of direct current is connected between the structure and a temporary ground bed, and a known amount of current is drained from the structure and the change in potential and current flow are measured.

From these measurements the capacity and number of protective units can be calculated, according to Donald J. Waldie, of Southern California Gas Co., who discussed "A Recycling Timer for Interrupting Cathodic Protection Test Currents" at a recent technical service conference of the Pacific Coast Gas Association in Fresno, Calif.

From these measurements the capacity and number of protective units can be calculated. It is conventional and necessary to apply this current in on-and-off cycles, and the potential and current-flow measurements are taken during an "on" interval and repeated during an "off" interval.

A field-type instrument has been designed to interrupt periodically the test current circuit automatically.

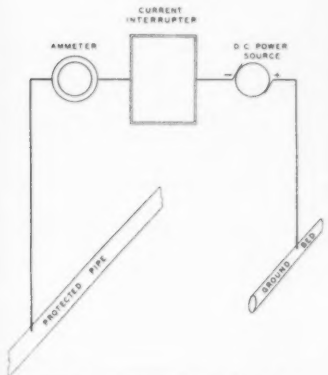
The instrument consists of a current inverter, a recycling timer, and suitable relays assembled in a sheet-metal housing. It is capable of interrupting up to 100 amp.

How it works.—Operation of the instrument does not require any special technique. The load terminals are connected in series with the negative terminal of the test-current source, an ammeter, and the structure to be protected.

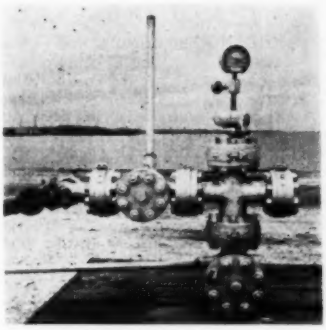
The positive terminal of the test-current source is connected to the ground bed. The accompanying diagram is a schematic of a typical circuit.

The test current is interrupted according to the interval chosen and the operation proceeds continuously in regular sequence. The instrument requires no further adjustment until a new sequence is desired. If the assembly is to remain unattended during the test a shunt and recording millivolt meter is substituted for the ammeter.

Advantages.—The instrument is portable, weighing only 28 lb., and sufficiently rugged for field use. It can be constructed from readily available parts which cost about $140. The necessary power for operation, 3.5 amp. and 12 volts, is obtainable from storage batteries. A crew member is relieved from the monotonous task of manually switching the test current and makes him available for more productive work.



TYPICAL CIRCUIT for forced-current drainage tests.



Straps Combat Corrosion

To aid in combating corrosion of flange grooves due to salt spray, Renwar Oil Corp., Corpus Christi, Tex., has eight directionally drilled wells on a peninsula in Copano Bay near Rockport, Tex., fitted with protective straps to cover the grooves. These straps (note them circling the grooves, with "buckles" on top on the horizontal section of this well head) were installed by fitting gaskets over the grooves. The steel bands were then bolted down tight.

Helmerich & Payne's New Lodge for Employes

This spacious lodge on Fort Gibson Lake near Wagoner, Okla., has been built by Helmerich & Payne, Inc., Tulsa, as a center of vacation activities for company employes. The lodge is on a 1,000-acre "Cherokee Club" reservation in a sheltered cove of the lake, and is open to all 600 employes of the drilling-contracting firm in six states. Through an ownership plan employes can purchase cabin homes near the big lodge and can retain it permanently unless he leaves the company. Thirteen have been built to date. If the employe terminates his employment, his entire investment is refunded.

New Charts Aid Cost Estimating for Rotary Wells

DRILLING contractors and operators in the Mid-Continent area now have available a "Drilling Data Service" which furnishes important know-how information in preparing original estimates and bid prices for new wells. The drilling information is consolidated on handy single-sheet graphical charts.

In effect the new data service can provide complete drilling information on actual wells drilled in the past, to be used as a guide for new drilling being considered.

This new service can be likened to a technical library on the drilling factors encountered in drilling actual wells to specific depths at specific locations. The well-information library idea is conducted as a subscription organization by Drilling Data Service, headquartered in Oklahoma City. The company is headed by Whit Mason and D. B. Rhea.

Origination of the "drilling data library" medium came about by Whit Mason while he was working as a drilling engineer for International Petroleum Corp., Ltd., in the oil fields of northern Peru and during later experience as consulting mud engineer in the Mid-Continent. Careful planning of future wells, from the standpoint of the many factors involved in efficient drilling was a part of his work. The northern Peruvian oil fields are heavily fault blocked and the conditions were often different from fault-block area to fault block area. Some of the "well charting" and drilling-data records which Mason evolved led to the inauguration of his commercial service in this field for Mid-Continent drilling contractors and operators.

Type of Drilling Charts

Drilling Data Service has standardized an illustrative form (see accompanying chart) which includes in one piece all pertinent, essential factors associated with the drilling and completion of a rotary well. At the top of the chart are condensed summaries as to the specific well location, the owner, the drilling contractor, drilling depths, etc. In a ruled rectangle under this is further information in more detail concerning the well being described. Particularly important here is the time analysis for various classifications of operations.

Referring to the standardized chart illustrated here, in the left-hand vertical columns are slope or hole deviation tests for the well, the driller's formation log, depth column, footage column for succession of bits, and column showing mud properties as tested at various depth intervals during the progress of the well.

Next comes a graphical plot of "elapsed drilling time versus depth." On this well progress curve notations are made at the side of all important events, such as casing points, mudding-up points, reaming operations, twistoffs, drill-stem tests, lost circulation, etc.

Drilling Data Service, in the production of its charts, also recapitulates or tabulates in separate boxes significant information such as:

1. **Detailed bit records** (depth interval per bit).

2. **Type of drilling equipment used** (derrick, draw works, number of engines employed and their horsepower, size of pumps used, etc.).

3. **Mud summary** (here are listed number of sacks of each specific mud material and costs of each).

4. **Formation tops.**

5. **Supply centers** (for equipment, for fuel, etc.).

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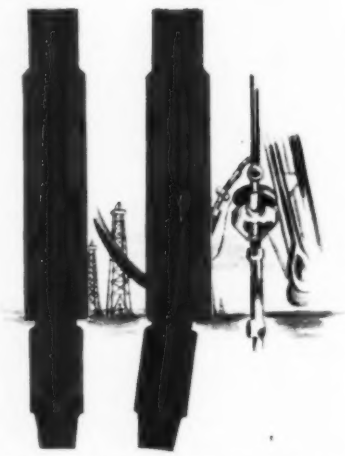

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WHIT MASON — D. B. RHEA

WILDCAT REPORT

OCTOBER, 1951

	DEPTH	SIZE	DAYS
RIGGING UP			2
SURFACE HOLE	254'	9"	
REAMING	216'	13-3/4"	2/3
RUN SURF. CSG.	200'	10-3/4"	
WAIT ON CEMENT			1
REAM INT. CSG.			
RUN INT. CSG., WOC			
RUN OIL STRING			
WAIT ON CEMENT			

	DAYS
RIG IN TO O.S. OR D&A	27-1/3
SPUD TO O.S. OR D&A	25-1/3
SURF. CSG. TO O.S. OR D&A	23-2/3
CO. DAYS TO O.S. OR D&A	1-1/4
TEARING DOWN	2-1/3
TOTAL DAYS ON LOCATION	29-2/3
DOWN TIME, TOTAL 38 HOURS	1-2/3
REPAIR 11-1/3 , MUD 8-3/4 HRS.	
FISH, JUNK 13½ HRS. OTHER: 4½ HRS.	

DAYWORK TIMES	HOURS
DRILLING	
CORING	
LOGGING 1	14
D. S. T. 1	10-2/3
CIRCULATING 2	3-3/4
WAITING	1-1/4
COMPLETING PLUG	9-1/4
TOTAL	39 HRS

13

SLOPE 1° 2° 3° 4°

FORMATION: RED BEDS; SHALE; SHALE AND LIME; LIME; SHALE AND LIME; SD & SH; LM, SH & SD; SH & LM; SD & LM; LM, SDY SH; SH & LM; SH & SD; SH & LM; SHALE; SH, SD, SDY LM; SHALE; SH & SD; SH, SDY LM; RD SD; SD & SH; LIME; SH & SD; SDY LM, SH; SH & LM; SH, SD, LM STKS; SH & SD; SHALE; SH, LM, SHLS; SHALE, SAND & WHITE SD; SD, SH, LM; SH & SD; SH & LM; SDY SH & LM; LM, RD LM; SH & LM; LIME; LM & SH; LIME; LM & SH; SH, LM, CHRT; LIME; SH & LM; LIME; LM & CHRT; LIME

DEPTH: 250, 500, 750, 1000, 1250, 1500, 1750, 2000, 2250, 2500, 2750, 3000, 3250, 3500, 3750, 4000, 4250, 4500, 4750

MUD: VIS 34 WT 10.2; VIS 38 WT 10.2; VIS 43 WT 10; VIS 40 WT 9.9; VIS 53 WT 10

ELAPSED TIME: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

SET TO 3/4" CSG W 200'/200 SX

BRIDGE

RMD 100'

RMD 60'

2702'

TWISTED OFF, FISHED 2 CONES

MUDDED UP

LOST 5" MUD

DST #1; 14 HRS

LOSING MUD @ 3900 & 3902' — REDUCED PUMP PRESS. TO 350#, STILL LOSING SLOWLY.

BRIDGE @ 4200'

4194'

BRIDGE @ 4040'

RMD 25' ON BTTM

LOG

TD 4710'

BIT RECORD

NO.	MAKE,	TYPE & SIZE			DEPTH IN	FEET	HOURS
SURFACE:							
1			9"		0	254	
2		REAMER	13-3/4		0	216	
BELOW SURFACE:							
1	HTC	OSC	9"	RT	254	583	
2	"	"	"	"	837	400	
3	"	"	"	"	1237	216	
4	"	"	"	"	1453	97	
5	"	"	"	"	1550	277	
6	"	"	"	"	1827	182	
7	"	"	"	"	2009	155	
8	"	OW	"	"	2164	73	
9	"	OSC	"	"	2237	96	
10	"	OSC	"	"	2333	46	
11	"	"	"	"	2379	113	
12	"	OSC	"	"	2492	66	
13	"	OSC	"	"	2558	144	
14	"	OSC	"	"	2702	43	
15	CP	SE	"	"	2745	95	
16	HTC	OSC	"	"	2840	31	
17	REED	BSKT 2HS-1	9"	NEW	2871	102	
18	HTC	OSC	9"	NEW	2973	45	
19	"	"	"	"	3018	64	
20	"	OSC-2	"	"	3082	37	
21	"	OSC	"	"	3119	116	
22	"	"	"	"	3235	66	
23	"	"	"	"	3301	186	
24	"	"	"	"	3487	184	
25	"	"	"	"	3671	90	
26	"	"	"	"	3761	198	
27	"	OW	"	"	3959	200	
28	"	7	"	RT	4159	67	
29	"	OW	"	NEW	4226	51	
30	"	7	"	"	4277	167	
31	"	OSC	"	"	4444	122	
32	"	7	"	"	4566	82	
33	REED	2HS-1	"	"	4648	19	
34	"	2CW	"	"	4667	7	
35	"	"	"	"	4674	36	
				TD	4710		

RIG

DERRICK: LEE C. MOORE, 97' 7" SUBSTRUCTURE
DWKS: WILSON GIANT
MOTORS: 1 WAUK. RKU, 225 HP; 1 WAUK. LRD, 325 HP
PUMP: OILWELL 14 PHD 7½ X 14"

SUPPLY

SUPPLY CENTERS: PERRY 16 MILES
FUEL: BUTANE

MUD SUMMARY

APPROXIMATE

QUANTITY	MATERIALS	COST
380 SKS	GEL	$ 774.25
2300 LBS	CAUSTIC SODA	166.75
2350 LBS	QUEBRACHO	446.50
2600 LBS	SODA ASH	97.50
11 SKS	MICA	35.75
8 SKS	SEAL FLAKE	112.00
7 SKS	FIBER-SEAL	21.00
	2% TAX	33.08
		$1686.83

FORMATION TOPS

AVANT	3295
OSWEGO	4136
SKINNER	4470
PINK LIME	4518
MISSISSIPPI	4618

Sec. 13 - 23N - 2W SW SW SE T. T. EASON & CO. #1 Kafka Noble County, Okla.

A Definition of a Crooked Hole

(Continued from page 99)

costs is difficult due to the many variables. However, even under the most favorable circumstances, an increase in allowable deviation in certain areas will result in appreciable savings. Some representative examples are:

In Carter County, Oklahoma, two wells were drilled on diagonal 10-acre locations. One well was drilled with a maximum allowable deviation of 5°, the other was allowed 7°. The over-all savings on the 7° well was $30,000 or, based on the estimated ultimate oil recovery, a savings of 13 cents per barrel. A comparison of two other wells in the same area indicated a savings of $10,000 or, based on the estimated ultimate oil recovery, a savings of 7 cents per barrel. These possible savings are often overlooked when compared to the total cost of drilling a well.

When converted to the cost per barrel of ultimate oil recovery, these savings overshadow many items that receive close scrutiny on a lifting-cost statement. A savings of $10,000 in the cost of drilling a well represents a savings of 10 cents per barrel on a well that recovers 100,000 bbl. of oil, or a savings of 1 cent per barrel on a well that recovers 1,000,000 bbl. of oil. Either saving is appreciable when compared to the items under consideration on a lifting-cost statement.

State Regulations as to Drift Angles of Wells

ARKANSAS:
- Less than 150 ft. from property line 3°
- Less than 300 ft. but more than 150 ft. from property line 4°
- Over 300 ft. from property line 5°

KANSAS:
- No governing state rules.

LOUISIANA:
- Allowable deviation 3°

MISSISSIPPI:
- Operator shall file a record of all deviation tests taken. No well shall cross drilling-unit line unless permit is obtained from the State Oil and Gas Board.

NEW MEXICO:
- If deviation in any 500-ft. interval averages more than 5°, a directional survey must be filed with commission before any oil or gas is sold.

OKLAHOMA:
- Shall not unreasonably vary from vertical.

TEXAS:
- None, except in the East Texas field where deviation is limited to 3°.

When discussing hole deviation, horizontal displacement should not be ignored. Again, vertical deviation in itself is no indication of horizontal displacement. Only deviation and direction will determine the location of the well bore at any given depth. Horizontal displacement is of importance in relation to lease lines and well productivity in relatively narrow pinchout-type reservoirs or reservoirs on sharp structures. There is the moral and legal responsibility to not cross lease lines, and the economic responsibility to penetrate the reservoir when it may underlie only a portion of the lease. These factors require a knowledge of horizontal displacement, rather than drift angle alone.

Before relaxing vertical deviation requirements, state regulations should be consulted. Presently, the oil-producing states generally have regulations that govern the permissible vertical deviation. Accompanying is a digest of drift-angle regulations pertaining to several oil-producing states. The information presented below does not pertain to intentionally deviated holes.

It is hoped that the industry will realize that the deviation clause as now used does not, as many believe, assure a particular type hole or one that is reasonably free from drilling or producing difficulties. In addition, in certain areas the contract requirement to drill a well within the generally accepted deviation limits of 3°

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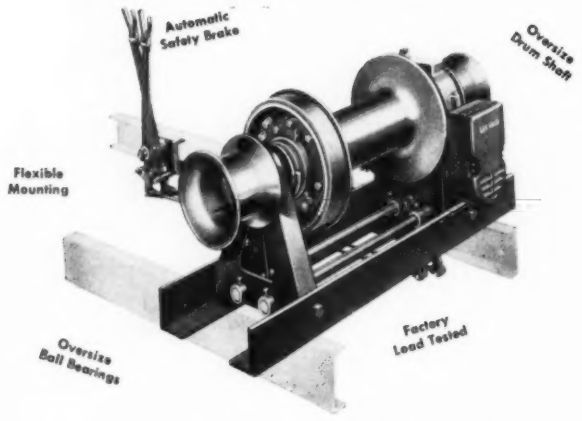

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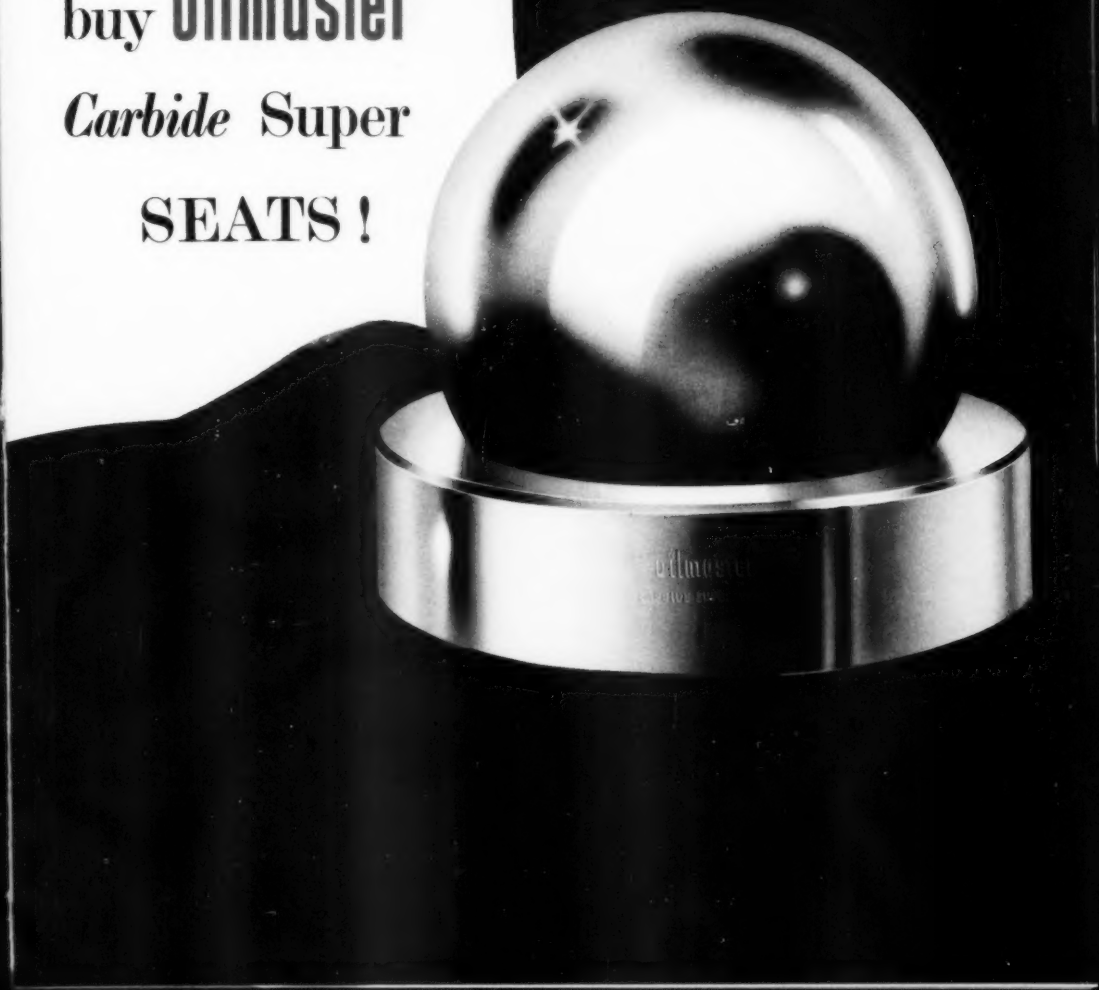

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or 5° may result in costs that greatly exceed those which cause great concern after the well has been placed on production.

Presently it is not possible to determine changes in drift angle and direction of drift at the time the changes occur. However, for particularly exacting drilling requirements, specialized equipment is available to determine drift angle and direction of drift at frequent intervals.

Even with present limitations, the study of directional surveys and drilling rates will reveal areas in which the drilling cost may be reduced without sacrifice by permitting an increase in the allowed deviation. Further, when drilling deep wells, consideration should be given to running directional surveys at selected intervals so that radical changes in direction or rate of drift may be corrected before drilling has progressed beyond where it is practical to make the necessary correction.

Transco's Deep Marine Crossing at Arthur Kill

(Continued from page 102)

on shore raised the other end of section to the proper height for alignment.

While making this final tie-in weld, a patrol boat notified passing boats so that their speed was reduced to a rate which would not produce swells to disturb operations. Although the boat captains were not legally obliged, they courteously complied.

The operations including welding as well as the priming, coating, and concrete jacketing in the vicinity of weld, were completed in 4 hours ending up in a severe snow storm.

Backfilling, contracted by Morris & Cummings, was accomplished by four dumps per day from bottom dump scows during slack-water periods for depositing coarse sand and gravel backfill.

Rock in the trench had been blasted and removed. Sand had been pumped ashore for hydraulic fill during dredging by Arundel Corp.

Pulling and welding operations at Arthur Kill were performed for Transco by Samuel Gallucci & Sons, Inc., with marine equipment rented from Merritt-Chapman-Scott Corp.

Coating and jacketing.—A vital part of the project was the coating and jacketing for adequate protection and ballasting. Materials were applied at a plant installed for the job by H. C. Price Co.

The ⅝-in. Somastic coating consists of 63 per cent sand, 24 per cent lime, 12 per cent asphalt, and 1 per cent asbestos. As a joint passes through the plant, Somastic is extruded through a circular nozzle and applied to the pipe by rotating blades. Pipe ends are later coated by field mold operations.

The Hevicote concrete jacketing contained sufficient barytes to increase weight from normal sand-and-cement concrete of 144 lb. per cu. ft. to 200 lb. per cu. ft.

Concrete was reinforced by spiraling an overlapping band of broad-mesh wire around the pipe for each inch of concrete.

A mixture of cement and graded aggregate having a minimum moisture content was fed through high-speed wire brushes and bombarded against the pipe as it revolved in a horizontal position. Ridges or uneven spots were removed by a trimming brush.

Since Hevicote is extremely hard, it can be readily manipulated by tractors handling it with either wire slings or belts. (Hardness of the concrete was demonstrated when it took several hours with a pneumatic drill to break off a few feet from the pipe.)

The Arthur Kill crossing is part of a project for building a second line from New Jersey. The first line was completed in 1950 to Manhattan Island terminating at 134th Street. The second line now under construction traverses Staten Island from Arthur Kill and crosses the Narrows to a terminus in Brooklyn. The two lines into the New York Metropolitan area insure continuous service.

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QUESTIONS on TECHNOLOGY

by W. L. Nelson
Consulting Engineer

Yields In Viscosity Breaking—Part 3 Unaccounted-For Losses

Note: In two earlier issues (March 10 and March 24) of this page, the yields of gasoline, when producing 18° and 22° A.P.I. distillates were presented, and the gravities of cracked fuel oils were discussed with relation to viscosity of the cracked fuel oil.

Tables 1 and 2 show the yields of gasoline that can be expected when viscosity breaking heavy charge stocks for the production of substantial amounts of cracked distillates having gravities of 26° or 30° A.P.I.

The liquid volume per cent not accounted for as gasoline, cracked fuel oil, or distillate is called gas loss, and it has been found to be equal to about half of the degradation in A.P.I. gravity of the feed stock as it is degraded to fuel oil. Thus, if the gravity of the charge stock is 20° and that of the cracked fuel is 10°, the gas loss will be about 5 per cent. Note, however, that processing of the gas for polymer gasoline further reduces the gas or unaccounted-for loss. Stated mathematically for cracking without the withdrawal of distillate:

$$\text{Gas loss} = 0.5\ (A_S - A_T)$$

in which A_S is the A.P.I. gravity of the charge stock and A_T is that of the cracked fuel oil.

The gas loss when cracked distillates are cracked shows the same general relationship except that the symbol A_D is used for the distillate gravity. Thus, when producing "x" fraction of distillate:

$$\text{Gas loss} = 0.5\ (A_S - A_T) - 0.5x\ (A_D - A_T)$$

$$\text{or } 0.5\ [A_S - xA_D - (1 - x)\ A_T]$$

Gas losses vary widely, in some instances being twice as large as the

TABLE 1—PERCENTAGE OF 400° E.P. (10 R.V.P.) GASOLINE BY VISCOSITY BREAKING—PRODUCING 18° A.P.I. DISTILLATE

	A.P.I. of fuel oil	Yields of gasoline for these gravities (A.P.I.) of cracking stocks															
		8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Zero % distillate	0	25.8	27.4	29.0	31.6	34.2	36.8	39.4	42.0	43.8	45.6	47.4	49.2	51.0	52.4	53.8	55.2
	5	16.6	18.8	21.0	24.0	27.0	30.0	33.0	36.0	38.0	40.0	42.0	44.0	46.0	47.8	49.6	51.4
	10	....	4.0	9.0	12.6	16.2	19.8	23.4	27.0	29.4	31.8	34.2	36.6	39.0	41.1	43.2	45.3
	15	....	....	....	....	....	2.0	8.0	12.0	15.4	18.8	22.2	25.6	29.0	31.4	33.8	36.2
	20	....	....	....	....	....	....	....	....	....	....	4.0	9.0	13.0	16.5	20.0	23.5
10% distillate	0	25.4	27.2	29.0	30.8	32.6	34.4	36.2	38.0	39.8	41.6	43.4	45.2	47.0	48.4	49.8	52.2
	5	15.8	18.4	21.0	23.4	25.8	28.2	30.6	33.0	35.0	37.0	39.0	41.0	43.0	44.8	46.6	48.4
	10	....	5.0	9.0	12.2	15.4	18.6	21.8	25.0	27.4	29.8	32.2	34.6	37.0	39.1	41.2	43.3
	15	....	....	....	....	....	2.0	7.0	11.0	14.4	17.8	21.2	24.6	28.0	30.4	32.8	35.2
	20	....	....	....	....	....	....	....	....	....	....	3.0	9.0	13.0	16.5	20.0	23.5
30% distillate	0	15.0	17.0	19.0	21.2	23.4	25.6	27.8	30.0	31.8	33.6	35.4	37.2	39.0	40.4	41.8	43.2
	5	9.4	12.2	15.0	17.4	19.8	22.2	24.6	27.0	29.0	31.0	33.0	35.0	37.0	38.8	40.6	42.4
	10	....	1.0	5.0	8.2	11.4	14.6	17.8	21.0	23.4	25.8	28.2	30.6	33.0	35.1	37.2	39.3
	15	....	....	....	....	....	1.0	5.0	9.0	12.4	15.8	19.2	22.6	26.0	28.4	30.8	33.2
	20	....	....	....	....	....	....	....	....	....	....	3.0	9.0	13.0	16.5	20.0	....
50% distillate	0	8.2	10.6	13.0	14.8	16.6	18.4	20.2	22.0	23.8	25.6	27.4	29.2	31.0	32.4	33.8	35.2
	4	3.4	6.2	9.0	11.4	13.8	16.2	18.6	21.0	23.0	25.0	27.0	29.0	31.0	32.8	34.6	36.4
	10	....	....	1.0	4.2	7.4	10.6	13.8	17.0	19.4	21.8	24.2	26.6	29.0	31.1	33.2	35.3
	15	....	....	....	....	....	....	3.0	7.0	10.4	13.8	17.2	20.6	24.0	26.4	28.8	31.2
	20	....	....	....	....	....	....	....	....	....	....	3.0	9.0	13.0	16.5	....	....
70% distillate	0	....	1.0	5.0	6.8	8.6	10.4	12.2	14.0	15.8	17.6	19.4	21.2	23.0	24.4	25.8	....
	5	....	....	3.0	5.4	7.8	10.2	12.6	15.0	17.0	19.0	21.0	23.0	25.0	26.5	....	....
	10	....	....	....	0.2	3.4	6.6	9.8	13.0	15.4	17.8	20.2	22.6	25.0	27.0	....	....
	15	....	....	....	....	....	....	1.0	5.0	8.4	11.8	15.2	18.6	22.0	25.0	....	....
	20	....	....	....	....	....	....	....	....	....	....	3.0	9.0	13.0	16.5	....	....

TABLE 2—PERCENTAGE OF 400° E.P. (10 R.V.P.) GASOLINE BY VISCOSITY BREAKING—PRODUCING 30° A.P.I. DISTILLATE

	A.P.I. of fuel oil	Yields of gasoline for these gravities (A.P.I.) of cracking stocks															
		8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Zero % distillate	0	25.8	27.4	29.0	31.6	34.2	36.8	39.4	42.0	43.8	45.6	47.4	49.2	51.0	52.4	53.8	55.2
	5	16.6	18.8	21.0	24.0	27.0	30.0	33.0	36.0	38.0	40.0	42.0	44.0	46.0	47.8	49.6	51.4
	10	....	4.0	9.0	12.6	16.2	19.8	23.4	27.0	29.4	31.8	34.2	36.6	39.0	41.1	43.2	45.3
	15	....	....	....	....	....	2.0	8.0	12.0	15.4	18.8	22.2	25.6	29.0	31.4	33.8	36.2
	20	....	....	....	....	....	....	....	....	....	....	4.0	9.0	13.0	16.5	20.0	23.5
10% distillate	0	21.8	24.2	26.6	28.4	30.2	32.0	33.8	35.6	37.4	39.2	41.0	42.8	44.6	46.0	47.4	48.8
	5	13.0	15.8	18.6	21.0	23.4	25.8	28.2	30.6	32.6	34.6	36.6	38.6	40.0	42.4	44.2	46.0
	10	....	2.0	6.6	9.8	13.0	16.2	19.4	22.6	25.0	27.4	29.8	32.2	34.6	36.7	38.8	40.9
	15	....	....	....	....	....	....	4.6	8.6	12.0	15.4	18.8	22.2	25.6	28.0	30.4	32.8
	20	....	....	....	....	....	....	....	....	....	....	1.0	6.6	10.6	14.1	17.6	21.1
30% distillate	0	9.0	11.4	13.8	15.6	17.4	19.2	21.0	22.8	24.6	26.4	28.2	30.0	31.8	33.2	34.6	36.0
	5	2.2	5.0	7.8	10.2	12.6	15.0	17.4	19.8	21.8	23.8	25.8	27.8	29.8	31.6	33.4	35.2
	10	....	....	....	1.0	4.2	7.4	10.6	13.8	16.2	18.6	21.0	23.4	25.8	27.9	30.0	32.1
	15	....	....	....	....	....	....	....	1.8	5.2	8.6	12.0	15.4	18.8	21.2	23.6	26.0
	20	....	....	....	....	....	....	....	....	....	....	....	1.0	5.8	9.3	12.8	16.3
50% distillate	0	....	....	1.0	2.8	4.6	6.4	8.2	10.0	11.8	13.6	15.4	17.2	19.0	20.4	21.8	23.2
	5	....	....	....	....	1.8	4.2	6.2	9.0	11.0	13.0	15.0	17.0	19.0	20.8	22.6	24.4
	10	....	....	....	....	....	....	8.2	10.0	11.4	12.8	14.2	15.6	17.0	19.1	21.2	23.3
	15	....	....	....	....	....	....	....	0	2.4	4.8	7.2	9.6	12.0	14.4	16.8	19.2
	20	....	....	....	....	....	....	....	....	....	....	....	....	1.0	4.5	8.0	11.5
70% distillate	0	....	....	....	....	....	....	....	....	....	1.0	2.6	4.4	6.2	7.6	9.0	10.4
	5	....	....	....	....	....	....	....	....	....	1.0	3.7	5.8	8.2	10.0	11.8	13.6
	10	....	....	....	....	....	....	....	....	....	1.0	3.4	5.8	8.2	10.3	12.4	14.5
	15	....	....	....	....	....	....	....	....	....	....	....	....	5.2	7.6	10.0	12.4
	20	....	....	....	....	....	....	....	....	....	....	....	....	....	....	3.2	6.7

formula shows and according to other plant runs nearly zero.

Illustration.—A 22° A.P.I. residual mixed base stock is to be viscosity broken or cracked for the production of only gasoline. By extensive cracking it is possible to obtain a cracked fuel gravity of 5° A.P.I. According to Table 1 under the column labeled 22° A.P.I., the gasoline yield is 49.6 per cent. The gas loss will be about:

$$0.5\ (22 - 5) = 8.5 \text{ per cent}$$

and in summary:

Gas loss	8.5
Gasoline	49.6
Fuel (by difference)	41.9

When the same 22° A.P.I. charge stock is thoroughly cracked but 30 per cent is withdrawn as a 26° A.P.I. distillate, the gravity of the fuel oil (see Part 2 of "Yields in Viscosity Breaking," March 24, 1952, p. 208) must be about 6 or higher. The gas loss will be:

$$0.5\ (22 - 6) - 0.3 \times 0.5\ (26 - 6) = 5 \text{ per cent}$$

and in summary:

Gas loss	5.0
Gasoline	35.0
Distillate	30.0
Fuel	30.0

Approximation of yields.—The yields of gasoline when producing cracked distillates as presented in these three articles on "Yields in Viscosity Breaking" can be approximated from the following equation:

$$\text{Per cent gaso.} = 13 + 2.5\ (A_s - A_T) - x\ [4 + 2\ (A_D - A_T)]$$

However, this is only a gross approximation, and its use may lead to erratic and strange results at extreme conditions. Thus, with respect to the illustration above, the gasoline yield becomes by the formula 39.8 per cent, whereas more accurately (Table 1) it was 35 per cent.

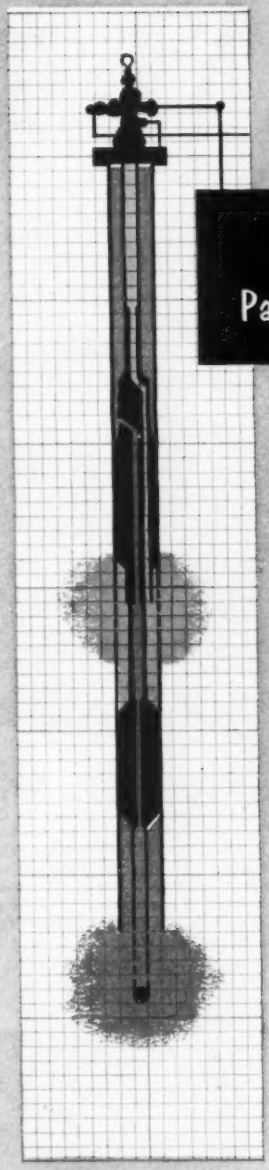
BOOKS

BUTANE-PROPANE POWER MANUAL. By Carl Abell. Published by Jenkins Publications, Inc., 198 South Alvarado Street, Los Angeles. 330 pp. $3.50.

This manual gives step-by-step directions for converting gasoline engines to butane-propane carburetion. Last year saw 100,000 installations in tractor, truck, bus, taxi, automobile, and industrial engines. It has the complete story of liquefied petroleum gas carburetion principles and equipment—from the tools needed to sales hints for getting and handling this business. It is designed for on-the-job use by mechanics and servicemen.

THE THERMODYNAMICS OF THE STEADY STATE. By K. G. Denbigh. Published by John Wiley & Sons, Inc., 440 Fourth Avenue, New York. 103 pp. $1.75.

This is another of the Methuen's Monographs on Chemical Subjects. Its writing developed from certain studies on the theory of open reactions systems. It was commenced at the Butterwick laboratory of Imperial Chemical Industries, Ltd., and was completed at Cambridge, in England.



Pay Off, or Pay-out?

A small producer recompleted as a dual well very often turns a break-even operation into a pay-out. The installation of an Otis "Selective" Cross-Over Nipple Assembly is especially recommended in such operations where there is little margin for costly workover jobs to maintain maximum production. For example, the Otis nipple assembly allows flow courses to be changed by wire line operations *under pressure, at the surface*—without the expense and downtime required to kill the well and round-trip the tubing—by simply running in an Otis Type X (cross-over) removable wire line choke (diagram) or a Type R (parallel) choke. Both chokes pack off gas-tight in the nipple, and at no time do the fluids commingle. The Otis cross-over head is made up as permanent sub-surface equipment on an Otis Type C or D "Selective" Cross-Over Packer or certain other production packers. A Baker-Otis "selective" dual-zone production hook-up, for instance, consists of an Otis cross-over nipple and a Baker Model D retainer production packer. If you contemplate a dual completion or recompletion, ask your nearest Otis office to explain more fully these and many other operating advantages—features that are not available in any other cross-over equipment on the market. Otis Pressure Control, Inc., 6612 Denton Dr., P. O. Box 7206, TWX DL-220, Dallas; offices in Houston, Corpus Christi, Victoria, Longview, Falfurrias, New Iberia, Houma, Shreveport, Odessa, Oklahoma City, Elk City.

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Cross-Over Nipple Assembly

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Model R combination rotary and cable tool rig. The design, construction and operating efficiency of this rig have made it the most popular rig. There are more Cardwell Models R, K and H double drum rigs in use all over the world than any other drilling and servicing rig ever built. Available in two smaller sizes. Models K and H, this rig is recommended for rotary drilling to 4,500 feet, cable tool drilling to 7,500 feet, and servicing jobs to 10,000 feet.

There are dozens of drilling and servicing contractors using Cardwell rigs who have started with a little and become millionaires.

Cardwell builds rigs that make money for the operator, and this is accomplished by building equipment that out performs and out lasts all others. Cardwell rigs are built of the best materials available . . . with heat-treated parts to reduce wear to an absolute minimum . . . parts are jigged to insure perfect fits . . . servicemen and parts stocks are readily available to all oil fields of the world.

Model L is the lightest weight and most up-to-date 3,500-foot draw works available. All drives, and the sand line and main drum, are driven by Cardwell "Flex-Disc" air friction clutches.

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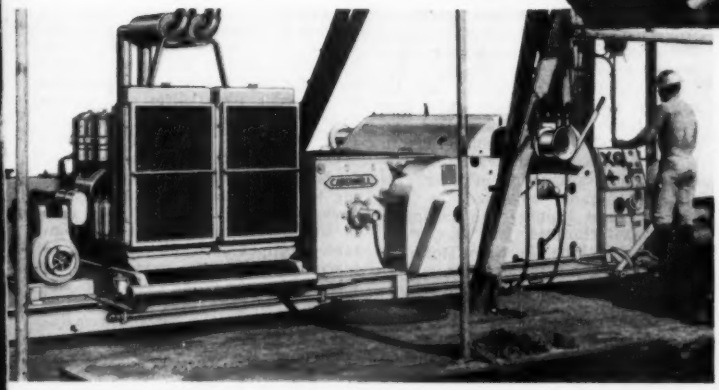

Model D is a super-smooth running, modern draw works. Completely Cardwell "Flex-Disc" air clutched, including the clutches running in oil bath in the chain transmission. The Model D is a fast, compact 5,000-foot drilling rig with single large or twin-engine or two separate engine arrangements.

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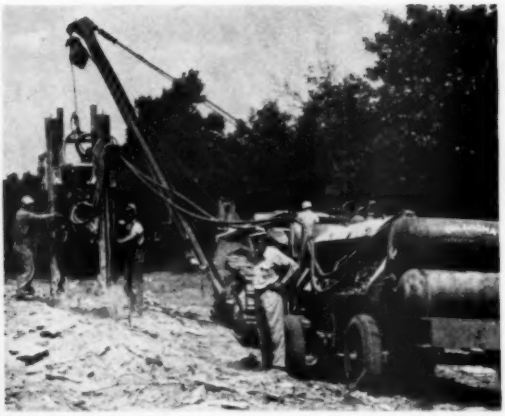
TWENTY-FIVE YEARS CARDWELL SERVING THE OIL INDUSTRY

Tractor removing joint from bending machine in Sturbridge, Mass., section of Northeastern Gas Transmission project.



Wagon-drill making shot-holes for blasting trench. A new type of blasting mat was successfully used on this job.

Northeastern Gas Line Proves Really "Tough Inch" Job

Berkshire country in Massachusetts offers more difficulty than heretofore-toughest construction found in mountains of West Virginia, or the White Mountains of New Hampshire

by Paul Reed
Pipe Line Editor

Bell-hole welders on rocky hillside between Springfield and Worcester, Mass.

OPERATIONS for laying Northeastern Gas Transmission Co.'s pipeline system across Massachusetts have been conducted under peculiarly difficult conditions. Oklahoma Contracting Co., which undertook the major part of the project, found that the work through the Berkshire hills in western Massachusetts was more difficult than construction in West Virginia, generally regarded as the toughest pipe lining in the country. This Massachusetts job was even harder than the Portland-Montreal line laid in Maine and across the White Mountains of New Hampshire.

The undertaking contracted by Oklahoma Contracting Co. included 163 miles of 24-in. main line from the vicinity of Albany, N. Y., to the Boston area, and 110 miles of lateral lines of 16-in. and smaller diameter connecting approximately 14 cities and towns. West of the Massachusetts-New York State boundary the line is owned by Tennessee Gas Transmission Co. This company transmits gas from the Gulf Coast area via Buffalo to supply Northeastern Gas Transmission Co., which owns and operates the facilities within the New England states.

Construction was started on May 1 and completed early in October 1951. First gas deliveries began as far east as Springfield in August. In addition to Oklahoma's operation, Britton Contracting Co., Inc., laid approximately 40 miles of laterals west of the Connecticut River.

Spreads.—Oklahoma Contracting had three main-line spreads of equipment valued at $3,500,000. Because of the severe conditions, much of the useful life of this equipment was used up on the job. In fact, new bulldozers were practically worn out by the end of the job.

Terrain.—The glaciated granite hills, cliffs, boulders, and peat bogs characteristic of the area presented serious obstacles to steady progress. There were many localities where procedures had to be changed within fairly short distances because the route went over cliffs and across peat bogs to more cliffs and more peat bogs.

On steep hillsides equipment had to be held by two tractors, according to the usual rough-country practices. While the Hell's Kitchen area of the Berkshire hills had a mountainous appearance, elevation at no place on the line was ever more than 1,200 ft. On one granite hill with elevation of 1,000 ft. near Westfield, 26 days were spent by an entire main-line spread in going only 7,000 ft.

Rate of progress.—However, in spite of the peculiar obstacles, the work went ahead at an average rate of 2,000 ft. per gang per working day. The job was shut down on Sundays. Cutting of right-of-way and ditching operations necessarily controlled progress of the entire job.

Ditching.—Since 70 per cent of the right-of-way was across the long stretches of granite and boulders that underlay the thin soil, the ditch was dug largely by drag lines and back

Here's Why!

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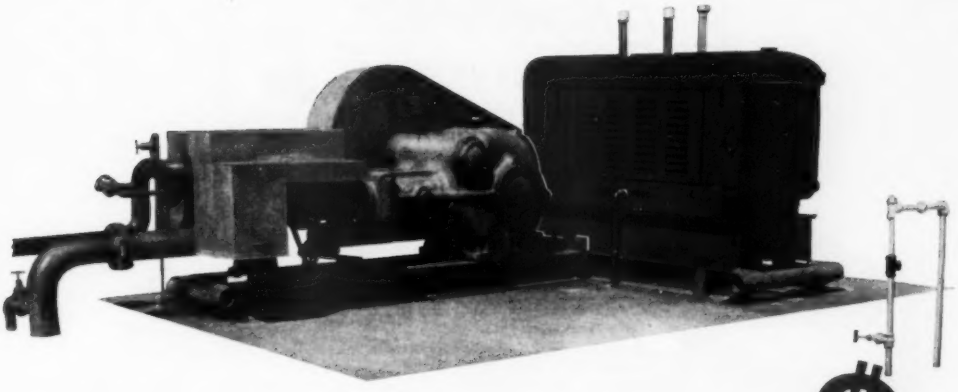

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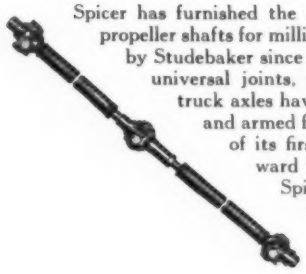

Spicer has furnished the axles, universal joints and propeller shafts for millions of the passenger cars made by Studebaker since 1905. And for many years Spicer universal joints, propeller shafts and light delivery truck axles have been used in Studebaker commercial and armed forces vehicles. From the broad foundation of its first century of success, Studebaker looks forward into another century of growth and expansion. Spicer joins the entire automotive industry in best wishes for continued progress.

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hoes. Shot holes were drilled by 15 wagon drills—5 per main-line spread. Shooting often had to be done five and six times in some spots. So hard is the granite that some drills would not last more than a foot.

Blasting mats.—A new type of blasting mat was successfully used to hold down flying rocks that might damage nearby houses and scatter over adjacent fields. Such mats are 20 ft. long and 12 ft. wide, made of ¾-in. steel cables.

Oklahoma's three ditchers were only used in the Connecticut Valley and a few other river-bottom localities. Specifications called for a 40-in.-wide ditch with 24-in. cover.

Clearing right-of-way.—Most of the entire route was heavily timbered. Hand saws were extensively used, as well as power saws, to insure that work progressed steadily without lengthy interruption from failure of mechanical equipment. Clearing of the 50-ft. right-of-way was completed by 29 bulldozers.

Peat bogs were crossed on corduroy roads sometimes built with four and five layers of timber. Dry draws were spanned by unsupported pipe for distances up to 50 ft. Most of the country-road crossings were cut, but a few were bored.

Taping field joints.—Pipe for lateral lines was yard coated and wrapped at temporary field operations of Pipe Protective Service, Inc.

An unusual feature of the project was the application of Tapecoat—an impregnated tape for wrapping the ends of joints on lateral lines. While the material was expensive it saved money through eliminating crews with small dope pots for work at field joints and abrasion points.

Cranes and hoes.—There were 45 draglines and trench hoes for the three spreads. Each spread had 3 cranes unloading pipe at railheads, and 2 draglines plus 10 trench hoes for ditching along the right-of-way.

The 16 boom tractors with each spread worked as follows: two with pipe gangs; two with bending; two with cleaning and priming; two with dope; three with lowering in and tiein; four with wagon drills; and one for unloading in stringing operations on the right-of-way.

Welding.—Overland pipe has ⅛-in. wall. River pipe has ½-in. wall. All pipe is furnished from Republic Steel Co.'s Gadsden, Ala., mill.

The routine procedure of Oklahoma Contracting Co. for the project was as follows: Oklahoma Contracting handled all operations including stringing of pipe in the right-of-way.

All pipe was smooth bent by mechanical bending machines.

Welding was done by usual manual welding methods: Approximately 50 per cent of the electrodes were Fleetweld No. 5 (⅛ and 5/32-in.) for stringer and cap bends. The two filler beads at each weld were applied with No. 85 electrodes; 40 per cent of all electrodes on the job were No. 85, ⅛-in., and 10 per cent were No. 85, 5/32-in.

Since the welding gang of 10 to 12 welders worked close to the pipe gang, the practice of applying a hot pass was seldom used. There was no automatic welding or double jointing.

Pipe protection.—Pipe was protected by single coating and wrapping with coal-tar enamel, glass mat, and asbestos felt except at river crossings where it was double coated and wrapped. River crossings were laid with rock shield, wood slats, and river clamps. Rock shield was also widely used in all rocky ground.

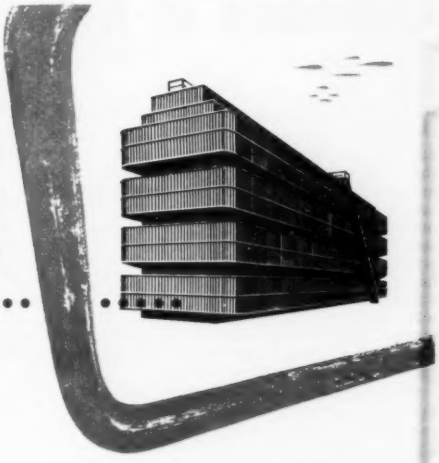
Coated pipe was mostly laid on skids before lowering in. There was very little cradling into the ditch.

Inspection.—Ten per cent of the welds were X-rayed and an electronic holiday detector followed coating operations.

Supervision.—Construction operations for Oklahoma Contracting Co. were directed by T. A. Hester, president, and Paul R. Halbert, W. H. Law, and Ben O. Law, vice presidents. Spread superintendents were Panama Shifflett, Ed Flanagan, Louis Visentine, and H. A. Wylie.

let fluor inspect your cooling tower

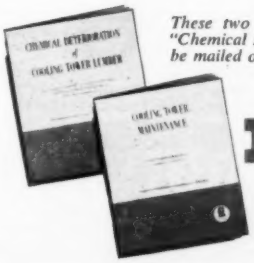
at least once a year



To keep cooling towers in tip top condition and to add years to their life, they should be shut down and thoroughly cleaned from top to bottom at least once a year. A thorough inspection of the structure should be made to determine the repairs and replacements necessary to keep the towers operating at peak performance.

Fluor maintains a special division for just this service. Regardless of the type or make of your cooling tower, Fluor's qualified personnel will gladly make a free inspection, provide a written report of its condition together with recommendations for repair, furnish a complete blueprint and an itemized breakdown of materials needed, plus a cost estimate (including labor)—without charge or obligation.

Fluor's years of experience with all types of cooling systems can save you money on cooling tower repair jobs. Fluor will handle the entire repair job or any part of it on a contract basis or on cost-plus. Arrange for an early inspection by calling any Fluor office.



These two articles "Cooling Tower Maintenance" and "Chemical Deterioration of Cooling Tower Lumber" will be mailed on request by writing to

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CORROSION

and its control

Corrosion in Monoethanolamine Solutions

THE development of the amine process for the removal of the acid gases from natural and refinery gas, together with the later combination amine-glycol process for the simultaneous removal of water has, as most petroleum treatment processes seem to do, brought in its wake a set of corrosion problems. These have been thoroughly investigated by Riesenfeld, Blohm, and Hughes,[1,2,3] who find two general methods of coping with the difficulties—modification of process conditions, and the use of properly selected alloys.

The acid gases, carbon dioxide and hydrogen sulfide, are the major corrodents in amine systems. Decomposition and oxidation products of the monoethanolamine itself, at first suspected of being the chief agent, are now believed to play at most a minor role. Contributing and complicating factors are free oxygen, high temperatures at the metal surface, and, in some instances, organic acids such as formic and acetic; the latter may be present in the gas or may be decomposition products from a prior process in the stream.

Electrolytic action between the hydrated iron oxide end product of the carbon dioxide and oxygen attack on steel, on the one hand, and the steel itself on the other, appears to be of critical importance in aqueous amine solutions. This is borne out by the fact that the most serious attack occurs in the reboiler, where the concentration of the acid gases is the highest, and where water is present in the liquid phase.

The critical factor in glycol-amine systems seems to be the decreasing alkalinity of the amine with increasing temperature, possibly reaching distinctly acid values on a local scale; thus the most severe attack tends to be in the hottest passes of the heat exchangers.

Three things can be done to lessen greatly the rate of attack, without the use of more resistant materials. If it is possible, without serious interference with the process, to reduce the operating temperatures, a considerable measure of relief will usually be had. Even plain carbon steel is not too seriously attacked at temperatures as high as 240° F., but the rate increases rapidly above that point. The removal of oxygen which may be present will also decrease the attack to an appreciable extent. Also, if organic acids are present, their removal is necessary in order to secure effective control. There are, however, many installations in which neither oxygen nor organic acids are significant factors, and in which it is not possible to reduce the operating temperatures. In such cases the substitution of more resistant materials in contact with the damaging fluids is the only way of meeting the problem.

Since the essential mechanism of the corrosion in the two systems is different, and since it occurs in different types of equipment, it is not surprising that a different choice of materials is to be made for aqueous amine and glycol amine systems respectively.

In the former, where the attack is likely to involve some galvanic action, and where, as has been mentioned, the critical location is the reboiler, types 304 and 316 stainless steels, Monel, Iconel, and Carpenter 20 steel have been found satisfactory. It will be noted that all of these materials have passive characteristics. It is also pointed out that the control of oxygen and temperature are of importance in aqueous amine solutions, which also correlates with the observation concerning passivity.

In glycol-amine systems it is generally the heat-exchanger tubes which are most rapidly attacked. The attack is, in fact, concentrated in the hottest part of the hottest pass as a general rule. Anything which can be done to reduce the local temperature will prove helpful, but this is not always possible in existing equipment, nor is it necessarily the most economical approach to the problem. Aluminum 3S alloy, aluminum 3S Alclad, and 4-6 Cr., ½ Mo steel have proved to be satisfactory materials for tubes in this service. Both of these materials are characterized by passive behavior, but their susceptibility to galvanic attack makes them of doubtful value in aqueous systems. No galvanic effects were observed in glycol solutions, however.

The upper part of the still itself is often found to be the object of attack in glycol-amine systems. Linings of either of the materials indicated above are suitable under these circumstances. If the attack is not too severe, it is probable that metallizing with aluminum would be a satisfactory treatment, and one which would be rather easily repaired when necessary.

References

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2. F. C. Riesenfeld and C. L. Hughes, "Corrosion in Amine Gas Treating Plants," Petroleum Refiner, 30:2:97-106, February 1951.
3. F. C. Riesenfeld and C. L. Blohm, "Corrosion Resistance of Alloys in Amine Gas Treating Systems," Petroleum Refiner, 30:10:107-115, October 1951.

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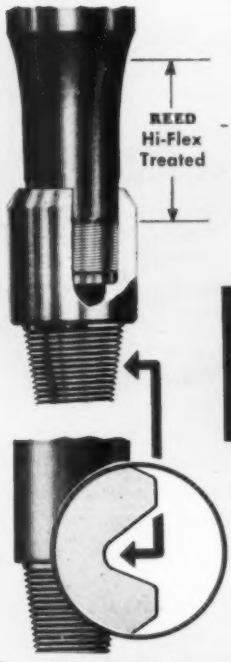

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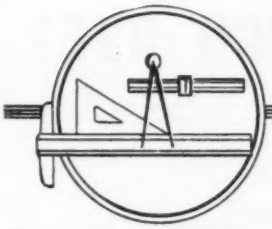

ENGINEERING *fundamentals*

No. 475

Recovery Data for Water-Flood Projects Prior to Water Flooding

DURING recent years, considerable amount of study has been given to the estimation of recovery factors based on the physical properties of the reservoir rock and the reservoir fluid. The recovery factor expressed as per cent of oil in place is related to the following: (1) connate water content, (2) formation volume of reservoir oil, (3) viscosity of reservoir oil, (4) physical character of reservoir rock, and (5) type of recovery mechanism.

The recovery in barrels per acre-foot for a given set of conditions depends upon the porosity. The volumetric method of estimating oil recovery has gained wide acceptance, the accuracy of the method depending upon the availability of data and the interpretation placed upon them.

The range of recovery in barrels per acre and barrels per acre-foot for a group of Oklahoma sands is illustrated in Table 1 by data from U. S. Bureau of Mines publication RI 4832 referring to sands being water flooded. For most of the sands, the natural recovery mechanism was dissolved gas drive and in some cases vacuum or gas injection was used as a secondary recovery method. The fields had been producing 15 to 35 years prior to water flooding.

The data of Table 1 obviously have little value as a basis for estimation of recovery except where like conditions are being compared. However, core-analysis data, net oil-sand thickness data, and reservoir fluid data will provide satisfactory explanations for the variation of the recovery factor between different fields and sands. At the time of development of the tracts referred to in Table 1, reservoir data were entirely of a qualitative nature, but today it is possible and good practice to secure sufficient reservoir data in the early state of development to provide a reasonably accurate prediction of the future behavior of the reservoir and the benefits to be obtained by fluid injection at various stages of depletion.

Three northeastern Oklahoma counties—Nowata, Craig and Rogers—accounted for more than 86 per cent of the oil recovered between 1931 and 1949 in the state by means of water-flooding projects in partly depleted oil fields. About 33 million barrels of oil were recovered from 162 projects of this type.

By 1950, water-flooding operation accounted for 63 per cent of the total oil production in this area of northeastern Oklahoma, or about 2¼ million barrels. It is estimated that by January 1, 1950, an average of 2,006 additional barrels of oil per acre had been recovered from the area's 14,180 acres out of the state's total of 18,221 acres covered by water-flooding projects. In fact, one old lease produced by water-flooding 1.6 times the amount of oil previously recovered by earlier conventional methods, according to the report.

TABLE 1—RECOVERY DATA FOR VARIOUS OKLAHOMA OIL SANDS PRIOR TO WATER FLOODING
(From U.S.B.M. RI 4832

Ref. No.	Sand	Gravity of oil, °A.P.I.	Depth of sand (ft.)	Sand thickness (ft.)	Recovery prior to water flooding		Secondary method before water flooding	Response to water flooding
					Bbl./ac.	Bbl./ac.-ft.		
1	Prue	41	2,600	50	1,677	33	V	F
2	Glenn	36	1,485	46	6,005	130	V	P
3	Layton	40	1,340	30	1,327	44		I
4	Prue	41	2,600	50	2,563	51	V	F
5	Layton	37	1,500	40	2,932	73	V	F
6	Bartlesville	40	2,800	80	10,651	133	V-G	New
7	Crews	42	2,100	19	5,612	296	G	New
8	Booch	35	2,900	28	5,000	178		New
9	Stray	30	500	50	6,080	122	V-G	New
10	Dutcher	32	1,800	30	6,483	216	G	New
11	Buzzard	39	325	15	2,601	173	A	U
12	Wayside	35	950	50	2,262	45		U
13	Wayside	36	900	55	2,386	44		F
14	Wayside	35	1,550	25	3,387	136		New
15	Wayside	32	1,000	30	1,163	39	V-A	F
16	Bartlesville	34	1,500	100	4,614	46	G	P
17	Bartlesville	32	1,700	32	1,320	41		U
18	Wayside	35	1,550	25	1,107	44		F
19	Cleveland	37	1,380	16	1,020	64		F
20	Skinner	36	2,600	25	1,660	66	G	F
21	Allen	31	780	12	1,144	95	G	F
22	Bartlesville	33	1,160	50	5,638	113	G	New
23	Bartlesville	37	1,200	15	4,934	330	V-G	F
24	Bartlesville	31	1,300	20	5,700	285	V-G	New
25	Bartlesville	37	1,250	28	6,194	222	V-G	New
26	Bartlesville	37	1,235	28	6,295	224	V-G	F

Note: V—Vacuum, G—Gas injection, A—Air injection, U—Unsatisfactory, P—Poor, I—Inconclusive, F—Favorable.

The report, prepared by John P. Powell and Kenneth H. Johnston, petroleum engineers, Bureau of Mines, Bartlesville, Okla., together with Report of Investigations 4832, "A Survey of Oil Production in Oklahoma by Water-Flooding, Counties Other than Nowata, Rogers, and Craig," supplement the information contained in Bureau of Mines Report of Investigations 3726, "History of Water-Flooding of Oil Sands in Oklahoma," by describing water-flooding activities in the state from July 1, 1942, to December 31, 1949.

A free copy of Report of Investigations 4831, "A Survey of Oil Production in Oklahoma by Water-Flooding, Part I—Nowata, Rogers, and Craig Counties," may be obtained from the Bureau of Mines, Publications Distribution Section, 4800 Forbes Street, Pittsburgh.

Prepared by Rex W. Woods, petroleum engineering consultant, Tulsa

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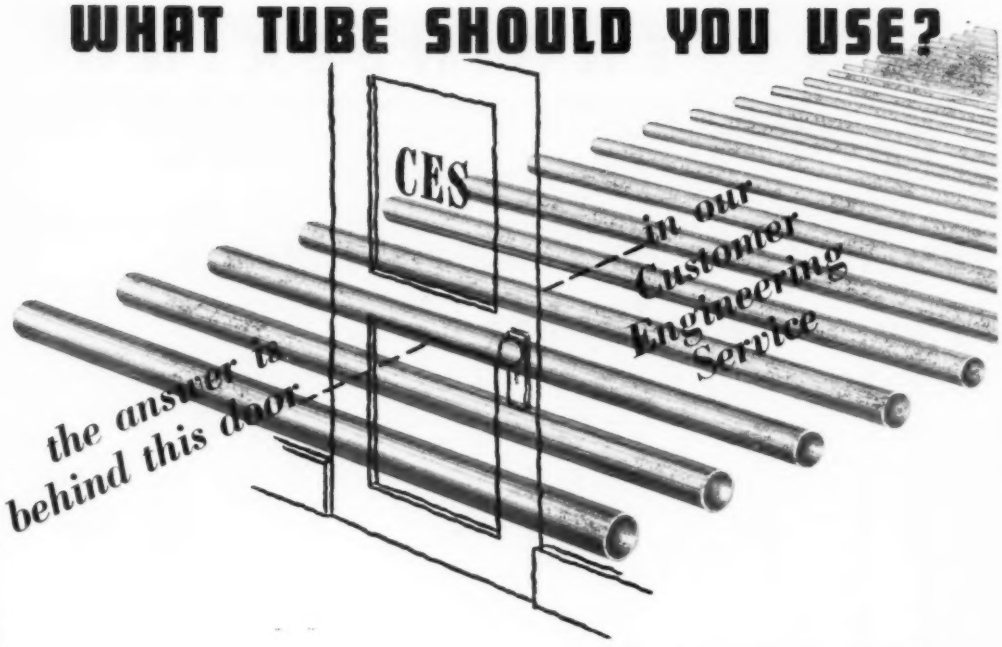

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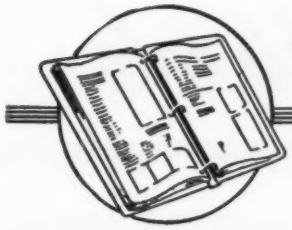

THE REFINER'S notebook

No. 116

Bellows Relief Valve

by S. Chesler* and B. W. Jesser†

BALANCED disk and piston types of back-pressure relief valves were considered in the two preceding installments. In the bellows relief valve, a different principle is used. By welding one end of a bellows to the disk and sealing the other end against the guide plate, a definite seal is obtained between the bowl and the bonnet. This prevents any gases from entering the bonnet, and thus, there are no pressure forces exerted on that portion of the top of the disk that is within the bellows. There are two types of bellows valves, namely the unbalanced and the balanced.

Unbalanced bellows.—Fig. 1 illustrates the unbalanced construction. As indicated in Fig. 2, where the mean bellows diameter is greater than the seat diameter, this unbalanced condition results in forces D being less than C when back pressure is superimposed, thus causing the disk to lift off the seat below set pressure. Tests with both steam and gas have confirmed this point. Capacity tests on the unbalanced bellows valves have been highly successful. Tests with gas showed that rated capacity was maintained to critical. Beyond that point the data followed a fairly smooth curve somewhat above the theoretical. Tests on two diifferent valve sizes and at two different pressure ranges were in surprisingly good agreement from a capacity point of view. In a test with steam good results were obtained except that beyond the critical the capacity was somewhat below the theoretical. The unbalanced bellows relief valve has been used in corrosive and asphalt service where variable back pressure is not a factor. This valve will not maintain a constant reset pressure over the back pressure range.

Balanced bellows.—This relief valve is illustrated in Fig. 3 and the pressure effects in Fig. 2. By reducing the mean diameter of the bellows until it equals the diameter of the seat, the pressure effects of forces D and C are equalized. In this way the disadvantage of the unbalanced bellows valve in opening below set pressure is eliminated.

*Piping engineer, and †head of piping analytical section, M. W. Kellogg Co. Portion of paper presented at Toronto meeting of A.S.M.E.

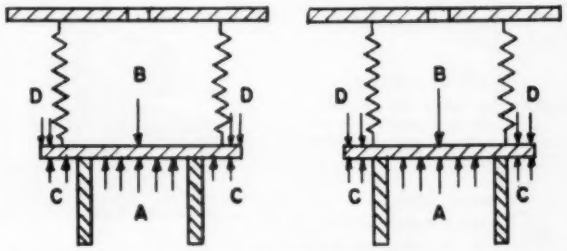

Fig. 2—Forces acting in (left) unbalanced bellows and (right) balanced bellows relief valves.

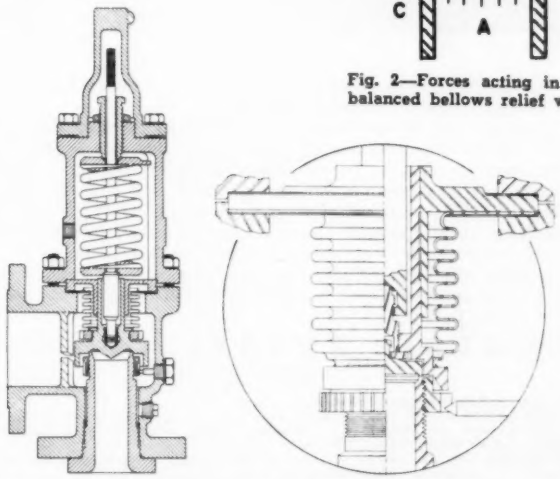

Fig. 1—Unbalanced bellows relief valves, (left) Manning, Maxwell & Moore, and (right) Farris Engineering Co.

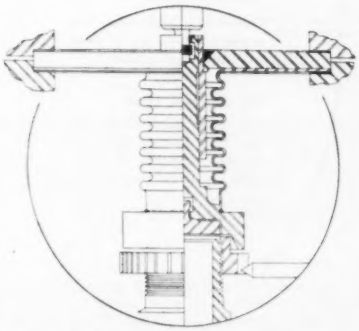

Fig. 3—Balanced bellows relief valve. (Farris Engineering Co.)

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16 OIL-BASE DRILLING FLUIDS presented at the third World Petroleum Congress at The Hague was written by George Miller, president of Oil Base, Inc. It presents a comprehensive analysis of oil-base muds, explains their general use and special applications, and gives actual production data on many wells drilled with Black Magic. *Oil Base, Inc.*

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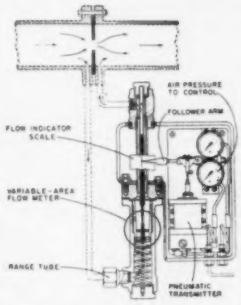
IT'S NEW ✓ CHECK IT

by Dan B. Miller

22 THE V/A CELL is an entirely new approach to orifice metering. Instead of measuring the static-pressure differential across the orifice the new unit meters a continuous bypass stream around that orifice. Since metering is kinetic, a constant flow continuously purges the lead lines. A linear relationship exists between the metering bypass flow and the main flow past the orifice. The linearity and the consequent 10-to-1 rangeability is inherent in the new method. The new method permits very simple adjustment of the bypass rate, to give the unit enormous flexibility. It is adaptable to pneumatic connection to points remote from the orifice run. In refining, these characteristics mean less freezeup and clogging of lead lines, elimination of condensate pots in steam metering, greater linear-scale chart accuracy, and rangeability enough to handle different flow ranges as demands vary. Further, the unit's design permits greater freedom in piping and refinery layout. *Fischer & Porter Co.*

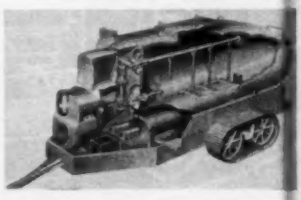


IT'S NEW ✓ CHECK IT

23 NEW SIDE-ENTERING TANK MIXER designed especially for the petroleum industry is made in sizes ranging from 1 to 30 hp., with propellers up to 27 ft. in diameter. It is compact and rugged in design to provide ready accessibility and ease of maintenance. A positive locking-type shaft seal makes it possible to repack the propeller shaft without leakage while the tank is full. All moving parts are completely enclosed for maximum safety. Mixers are furnished with electric motors, steam turbines, or other types of drivers. A considerable number of these mixers are in service on crude-oil storage tanks. In addition, they have a wide range of applications in refinery and chemical-process blending and mixing operations. All wetted parts are available in various materials for different corrosive conditions. *Sawyer-Jensen Co.*

IT'S NEW ✓ CHECK IT

24 MODEL "SP" DOPE KETTLE features double agitation among other improvements. Agitation is accomplished by a marine-type propeller plus a slow-speed bottom sweep. The combustion chamber has a double gas pass for bottom protection and fuel economy. Only a 5 per cent differential exists between top and bottom of the kettle. Samples of the mix to determine distribution of the filler show only a 1 per cent differential with the double agitation feature. Excellent insulation is provided by a 2-in. thickness of rock wool over all exposed surfaces. High temperatures can be maintained on a full night holdover. A simple plug-type drawoff valve kept warm by a hot dope jacket prevents freezing during shutdown periods. The valve will shut off completely regardless of foreign matter. Coking operation has been eliminated by the bottom sweep. The sweep is actuated by a heavy-duty hydraulic cylinder, preventing formation of coke. Dope capacity is 27 bbl. and weight (with tracks) is 17,020 lb. Height with tracks is 8 ft. 9 in. Width with tracks is 9 ft. 4 in. Power is furnished by a VF-4 Wisconsin motor with clutch reduction and electric starter. *Crutcher-Rolfs-Cummings, Inc.*



IT'S NEW ✓ CHECK IT

25 DIVIZOR AND ANGLE COMPUTER. Using only four readings from a center line, pipe layout is simplified with new, accurate computer having pointers made of stable Vinylite plastic rigid sheet. Engineers, piping foremen, draftsmen, and welders can make rapid layouts on the job of pipe bends up to 126°. The com-

The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

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Selective acidizing is useful in most old wells, particularly those with residual oil to be recovered from tight sections; those with high gas-oil ratios, or intermediate water zones; and those plugged back from bottom water or deepened to new pay zones. It is of value for new wells with saturated zones of varying permeability and those with a change of formation within the open hole.

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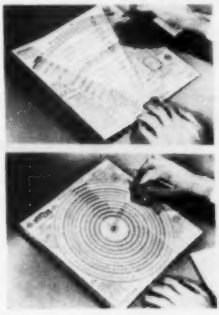
puter gives direct readings for any angle of bend up to 126°, in steps of 1° or less, on pipe diameters from 1 to 20 in. Complete angles of two pieces or multipiece bends, Y-layouts, etc., are read on the computer and transferred quickly to the actual pipe, templet, or drawing board. This instrument gives distances in inches along the pipe from a vertical center line. Only four measurement readings are required to mark a pipe at 16 different ordinate points on the circumference. The circle divider gives instant reading of circumference divisions from one-half to one-sixteenth in fractions of an inch for any circle up to 72 in. in diameter. Both instruments are available in folding type for field use and flat type for the shop. *Bakelite Co., Div. of Union Carbide & Carbon Corp.*



IT'S NEW CHECK IT

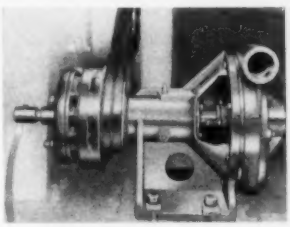
26 "CFD-1" HOLEMASTER is a self-contained unit and it is designed especially for fast shot-hole drilling. It is a completely engineered hydraulic chain feed drill. It has a rated capacity for holes to a depth of 1,000 ft. using 2⅜-in. drill pipe. Two hydraulic motors actuate the kelly feed through chain drives. The high-torque-capacity fluid motors give the necessary power without reduction gear boxes, jaw clutches, or other wearing parts. The motors operate through chain drives to an equalizing jackshaft which assures even tension on all chains. The motors free wheel while pulling up for spudding and rod connections. The entire feed mechanism is controlled by one lever, and spring-mounted sheaves in the crown automatically maintain proper adjustment on the feed chains. The hydraulic drive affords a smooth feed and prevents overstressing, stretching, or breaking the feed chains. Breaking joints and adding drill pipe are faciliated by the pivot-mounted back up tongs and roller type slips. *George E. Failing Supply Co.*

IT'S NEW CHECK IT

27 PACKAGED AUTOMATIC BUILTIN FIRE-EXTINGUISHING SYSTEMS. Each package contains temperature-rate-of-rise fire detectors and connector tubing, automatic control heads, discharge heads, Multijet nozzles, and a cylinder-supporting frame. Cylinders are shipped as a separate item. As it is impossible to know in advance what accessory equipment any customer will require, none is included in the basic package, but may be ordered separately. The systems may be ordered with or without pipe and fittings. If pipe and fittings are ordered, they are strapped together and shipped along with the carton containing the working parts of the system. For customers' convenience the necessary lengths and elements for each system are packaged in individual boxes and may be ordered as a single unit. Among the accessory items available are remote-control pull boxes, and pressure-operated trips to close doors and windows automatically. Provision can also be made for shutting down ventilation and machinery with pressure-operated switches. Alarm gongs and pressure-operated sirens are available. *Walter Kidde & Co., Inc.*

IT'S NEW CHECK IT

28 WICHITA WATER PUMP. Especially designed to meet the demands of oil-field service, the pump, a 2-in. centrifugal enclosed impeller type, offers extremely long life with a minimum of maintenance and attention. The shaft is much larger than those in conventional pumps and is covered with a thick layer of stainless steel under the packing gland. Packing is of the chevron type. The gland is automatically adjusted by two springs which supply the amount of pressure needed to keep the packing tight under normal conditions. Ball bearings are large. The suction pipe is 2½-in. and the discharge pipe 2-in. Capacity at 30 lb. is 250 g.p.m. at 1,800 r.p.m. Pump can be furnished with shaft extension for direct motor drive or with V-belt pulley keyed to shaft. It can be furnished with either a mechanical friction clutch or an air-tube disk clutch. *Wichita Falls Foundry & Machine Co., Inc.*



IT'S NEW CHECK IT

29 HOTCAN. For use in the field by pipe-line, drilling, and exploration crews, self-heating foods can be used in the event of industrial emergency or as a regular supply. Products cover a wide range including ham and eggs, beef stew, lima beans and ham, spaghetti and meat balls, chili con carne, and hot chocolate. Holes are punctured in outer can, a few drops of water are added to initiate action of heating chemical, and food within the sealed inner can is heated to serving temperature within 10 minutes. *Hotcan Corp.*

IT'S NEW CHECK IT

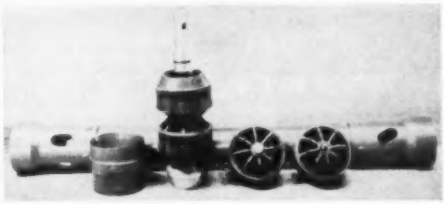
OIL AND GAS EQUIPMENT Digest

IT'S NEW CHECK IT

30 DRESSERTAPE. a new polyvinyl chloride pipe tape possesses exceptional dielectric and insulation properties. It has an insulation resistance of 100,000 megohms and dielectric strength of 10,000 volts. It has high adhesive firmness, extra strength, sunlight resistance, and excellent aging qualities. It provides effective protection against water, salt water, acids, alkalies, oil, and soil chemicals. It is applied cold and is therefore safe for workmen to use in cramped ditches and it requires no "settingup" period. *Dresser Manufacturing Division, Dresser Industries, Inc.*

IT'S NEW CHECK IT

31 NEW-TYPE SPACER PLUGS. used in a new cementing method, prevent contamination of cement slurry and occurrence of cement above top spacer plug. Both bottom and top plugs are constructed to seal in the direction of pressure drop, and create a moving liquid-tight seal against the casing. The plugs are pliable yet have much structural rigidity. Travel of the bottom plug is into a plug receptacle. As the bottom plug is caught in the receptacle flow continues uninterrupted through ports. A stall unit positioned in the coupling end of the bottom casing joint, permits passage of the bottom spacer plug but stops top spacer plug. *National Gas Equipment Co.*



IT'S NEW CHECK IT

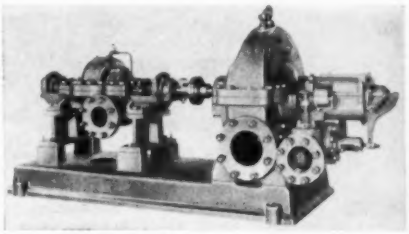
32 VISCO 953-X. a new chemical inhibitor for corrosion control in oil production is a polar-type organic material. Corrosion inhibiting characteristics are attributable to its property of being absorbed on metal surfaces to form a lasting film impervious to the attack of most corrosive agents. The product is a complex synthetic composition having medium fluidity at atmospheric temperatures. It contains no inorganic salts or alkalies, and is a bland dark colored liquid having no corrosive or hazardous properties. It is basic in reaction, having a pH of approximately 9-10, and is soluble in oil and dispersible in water. It is available for shipment in 5-gal. cans or 55-gal. nonreturnable steel drums. *Visco Products Co., Inc.*

IT'S NEW CHECK IT

33 NEW ALUMALOY DESICCATOR. A new lifetime cast-aluminum lightweight desiccator cannot be damaged by bumping or dropping. The Alumaloy desiccator, 4½-in. square, is a cast-aluminum-alloy body and cover. Ground joint seal assures airtight closure and the aluminum body dissipates the heat quickly. Finish is baked on gray metalized Hammerloid. *Laboratory Industries, Inc.*

IT'S NEW CHECK IT

34 DH STEAM TURBINE LINE. With the new horsepower increase, DH turbines are capable of developing 1,000 hp. with pressures up to 875 psi. at 750° F. The DH turbine is well adapted for mechanical drives with pumps, fans, blowers, stockers, generators, line shafts, and many other plant auxiliaries. DH Steam Turbines are single-stage impulse, double-impact type.



Steam is directed twice against a single row of blades by use of special steam-reversing nozzles, thus giving double impact to the rotor and converting energy within the steam into useful work. High-pressure steam does not come into contact with casing. All high-pressure parts and joints are outside and visible to the operator. *Dean Hill Pump Co.*

IT'S NEW CHECK IT

35 MIR-O-COL HARD-FACING ROD NO. 7. For oil-feed hard facings application including tool joints, churn drill bits, clutch jaws, fishtail and cable-tool drill bits impeller tips, kelly bushings, pump shafts and sleeves, and twin pins. Borderline applications, which heretofore were not economically feasible, now can be hard-faced profitably. Nine grades of rods are available for every type of application, for manual electric or acetylene application. It is a cast alloy rod containing chromium, nickel iron, and other alloys. Hardness of deposit is from 54 to 57 Rockwell C. The new No. 7 deposits more than 97 per cent of its alloy. *Mir-O-Col Alloy Co., Inc.*

IT'S NEW CHECK IT

NATURAL GAS

Revenues Climb

FPC reports 18.7 per cent increase last year

WASHINGTON. — Operating revenues of 82 natural-gas companies reporting to the Federal Power Commission were $1,557,073,468 last year, an increase of 18.7 per cent over the $1,311,585,960 recorded in 1950.

Figures just compiled by the FPC show that the gas-utility operating income for the year was $232,956,747, an increase of 8 per cent over the 1950 figure of $215,727,721, and net income was $183,922,891, up 2.6 per cent from $179,295,676.

The net gas-utility plant of the reporting companies aggregated $3,791,573,445 at the close of last year, up $625,893,191, or 19.8 per cent over the $3,165,680,254 reported on December 31, 1950.

Sales.—Gas sales to ultimate consumers last year aggregated 2,257,993,000 M.c.f., an increase of 13.4 per cent over the 1950 sales of 1,990,621,000 M.c.f., the commission reported.

These sales brought in $748,154,189, up 15 per cent from $650,718,337, classified as follows: Residential, $377,811,139 against $331,314,914, up 14 per cent; commercial, $75,313,254 against $66,636,131, up 13 per cent; industrial, $277,660,498 against $240,511,746, up 15.4 per cent; and other, $17,369,298 against $12,255,546, up 41.7 per cent.

Volumes taken by the several classes of consumers were: Residential, 697,385,000 M.c.f. against 519,954,000 M.c.f., up 14.9 per cent; commercial, 144,595,000 M.c.f. against 129,260,000 M.c.f., up 11.9 per cent; industrial, 1,419,067,000 M.c.f. against 1,275,220,000 M.c.f., up 11.3 per cent; other, 96,946,000 M.c.f. against 66,187,000 M.c.f., up 46.5 per cent.

The reports showed that the companies paid $199,857,565 in taxes last year, an increase of 31.3 per cent over the $152,260,608 paid in 1950. Federal taxes accounted for $128,878,196 of this against $93,110,615 in 1950, and state and local taxes for $70,979,369 against $59,149,993.

Buttonwillow Nearing End

BAKERSFIELD. — Buttonwillow, California's first dry-gas field, is nearing exhaustion.

Discovered in August 1927 and at its peak containing 33 producers, it now has only one small gas well. Since the field's discovery it has produced more than 35 billion cubic feet of dry gas.

The field, which lies about 30 miles west of Bakersfield, was opened by Milham Exploration Co., later taken over by Seaboard Oil Co. Last year Seaboard abandoned its last well, and early in March officially abandoned its old camp there. The sole remaining producer is owned by Standard Oil Co. of California.

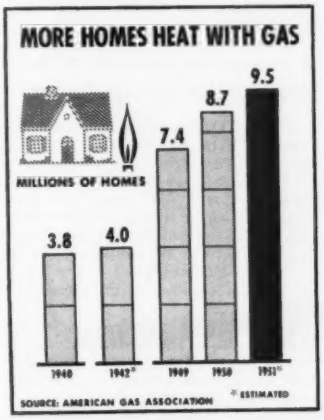
S.G.A. Completing Plans for Forty-Fourth Annual Meeting

GALVESTON.—The Southern Gas Association is looking for more than 1,600 delegates from 14 states to be present for its forty-fourth annual convention here April 28-30.

This year's program, featuring outstanding speakers from within and without the gas industry, will place heavy emphasis on sales.

Sectional meetings are scheduled to get under way April 28. Those attending the sectional meeting on transmission will hear Claude A. Williams, president of Transcontinental Gas Pipe Line Corp., Houston, lead off with a description of the need for rate increases for transmission companies.

Other addresses include: "Chemicals from Natural Gas," Sam Cottrell, Mathieson Chemical Co.; and "Security Investments in Natural Gas Transmission," August Belmont, of Dillon, Read & Co.



***EXPANSION SHOWS.**—Homes using gas for heating more than doubled in the past decade, spurred by soaring costs of competing fuels and by the rapid expansion of natural gas to new areas. Demand for natural gas continues unabated as revealed by a recent national survey showing that in areas served by piped gas, 87 per cent of all new homes built in 1950 used gas for space heating.*

A panel discussion on transmission operating problems will be held April 29. Topics at the panel will concern: "Natural Gas Gathering," led by E. F. Hindman, general manager of Louisiana Natural Gas Corp.; "Natural Gas Treating," Thomas S. Bacon, chief engineer of Lone Star Gas Co.; and "Natural Gas Transmission," T. S. Whitis, vice president of transmission for West Texas Gas Co.

Speakers at general sessions include: L. L. Dyer, S.G.A. president; Robert R. Suttle, S.G.A. managing director; George F. Mitchell, president of the American Gas Association; Gerry Swinehart, president of Car Byoir & Associates; Chester L. May, vice president of Lone Star Gas Co.; Edwin Vennard, vice president of Middle West Service Co.; and Ernest O. Thompson, member of the Texas Railroad Commission.

Natural Gasoline

Butler Interests Building New Plant in West Texas

AUSTIN. — Construction of a new natural-gasoline plant in East Vealmoor field of Borden and Howard counties, West Texas, is being pushed by the J. R. Butler interests.

During a hearing before the Texas Railroad Commission on gas flaring in Vealmoor field, Martin G. Miller, consultant for Butler, said that the firm is executing or has executed contracts with operators in East Vealmoor, Vealmoor, Good, and Reinecke fields.

He said negotiations have been completed with El Paso Natural Gas Co. to take the residue gas and that first deliveries to the pipe line should begin the latter part of this year.

The extraction plant will be completed a few months after first deliveries to the line begin.

January Plant Production Sets New All-Time Record

WASHINGTON.—Production at natural-gasoline and cycling plants set a new all-time record in January at 614,000 bbl. daily, according to the monthly natural-gasoline report of the Bureau of Mines.

January production represented an increase of 4,000 bbl. daily over December.

Starting with the January report, the bureau is showing a breakdown of each state's production into the major light-product classificaions of naural gasoline, L.P.G., and other products. Past reports tabulated only the product breakdown for total production. Also, the new report has been designed to give a better accounting of demand for individual products.

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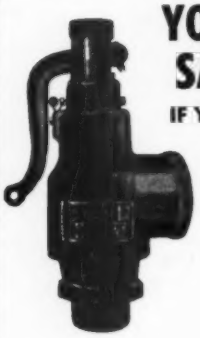

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REFINING

Shell Expanding Distillation Units at California Plants

WILMINGTON, Calif.—Shell Oil Co. has started installation of new crude-distillation facilities both at its refinery here and at its Martinez plant.

At Wilmington, the company is erecting a single-column distillation tower with a processing capacity of 52,000 bbl. daily which will increase total refinery intake by 20,000 bbl. daily to a new total of 86,000 bbl. The remaining 32,000 bbl. of the new unit's capacity will go to replace existing Trumble units, which were built in 1923 and now are obsolete.

The 20,000-bbl. new capacity at Wilmington will bring the plant's crude-distillation capacity more nearly in line with cracking capacity.

At Shell's Martinez refinery, new construction will increase distillation capacity by 5,000 bbl. daily.

The major addition here is a new distillation column which will separate light gasoline fractions from crude and thereby permit existing distillation units to process increased quantities of heavier fractions. Construction is scheduled for completion by the end of September.

These programs, together with others announced earlier for Shell's three refineries east of the Rockies, will add more than 95,000 bbl. daily to the company's capacity nationally at a cost of about $100,000,000.

American Petrochemical to Produce Antifreeze, Plastics

NEW YORK.—Plastics and antifreeze will be the initial products of the new petrochemical plant proposed for the Gulf Coast by American Petrochemical Corp. An application for a certificate of necessity for construction of the multimillion-dollar project has been filed by the company, a jointly owned subsidiary of Cities Service Oil Co. (Del.) and Firestone Tire & Rubber Co.

Cities Service last year produced 3,939,000 gal. of finished chemicals including formaldehyde, paraformaldehyde, antifreeze materials, acetaldehyde and methyl acetone-type solvents at its Tallant, Okla., plant, one of the first petrochemical units built in this country.

According to Cities Service's annual report, crude runs to stills in the company's refineries last year totaled 80,262,000 bbl., representing a gain of 7 per cent over 1950 operations.

Cit-Con Oil Corp.'s lubricating-oil refinery at Lake Charles, owned jointly with Continental Oil Co., produced 2,830,000 bbl. of finished lubricating-oil base stocks during 1951, a 39 per cent increase over 1950 operations. About 75,571,000 lb. of fully refined wax also was produced, representing a 6½ per cent increase over the previous year.

In research and development, Cities Service last year developed a new method of treating furnace oil which will make home burning oils virtually sludgeless and will avoid clogged filters and burner tips, the report said.

Program Plans Announced For Midyear Refining Meet

SAN FRANCISCO.—Ten technical sessions and an open dinner meeting are scheduled for the seventeenth midyear meeting of the Refining Division of the American Petroleum Institute which meets here May 12-15.

The production and recovery of aromatics will occupy two sessions. Five catalytic reforming processes will be discussed from the standpoint of their employment in dehydrogenating naphthenes to form benzene, toluene, zylenes, and other aromatic hydrocarbons.

The processes to be discussed include Platforming, Houdriforming, Thermofor catalytic reforming, Fluid hydroforming, and Atlantic catalytic reforming. Three recovery processes—Arosorb, Udex, and Shell's recovery technique—will be the subjects of three additional papers. The session will also include a paper on the electrolytic regeneration of treating solutions.

Full half-day sessions will deal with corrosion, training, automatic fuels, and atmospheric pollution. Two sessions each will concern analytical research and electrical equipment.

W. L. Stewart, Jr., vice president for refining of Union Oil Co. of California, will preside at the open dinner meeting. The principal speaker will be Dr. L. A. DuBridge, president of California Institute of Technology, Pasadena. Program chairman for the meeting is W. M. Holaday, Socony-Vacuum Oil Co., Inc., New York.

Phoenix Moves, Installs Former Rosewood Refinery

SAN ANTONIO.—Phoenix Refining Co., Inc., has moved a 3,000-bbl. plant, formerly owned by Rosewood Refining Co., to the San Antonio area from its original site at Bishop, Tex., in Nueces County.

Raymond Russell, president of Phoenix, said the plant will be placed in operation soon on a site adjacent

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Union Oil Establishes New Byproducts Chemical Branch

LOS ANGELES.—Union Oil Co. of California has established a new byproducts chemical division to process raw materials and byproducts into marketable chemicals and provide separate administration and development of such activities.

Union already is manufacturing methyl and ethyl mercaptan at its large Wilmington refinery, where two additional facilities are being constructed which will further its activity in the chemical field.

One plant, scheduled for completion late this year, will make molten sulfur through the recovery of hydrogen sulfide from refinery gases. Costing $450,000, it will have a capacity of 50 long tons daily.

The second plant, a 75-ton, $750,000 ammonium sulfate plant, will process acid sludge and ammonia, both byproducts of gasoline refining. The plant is expected to be in operation early next year.

The new division, headed by Harvey Fifer, formerly at the Oleum refinery, will be responsible for both production and marketing of chemicals produced in the new plants.

Conoco Cited for High Safety Record in 1951

HOUSTON.—Continental Oil Co.'s manufacturing and marketing departments were safer to work in during 1951 than any similar departments in the oil industry.

The National Safety Council has notified J. S. Boylan, Conoco's director of safety, that the company will receive its thirty-sixth and thirty-seventh annual council awards for safety marks achieved in these departments.

In addition to these top marks, the company's research and development department tied three other companies with an unmarred safety score during the year.

Conoco's Ponca City, Okla., refinery placed fourth among 17 major refineries competing with a record of 3,000,000 man-hours completed without a lost-time accident by 1,600 refinery workers.

Other company refineries contributing to the over-all high-safety record were the Lake Charles, La., plant, where there has been no lost-time accident since July 1947, and refineries at Billings, Mont., and Glenrock, Wyo.

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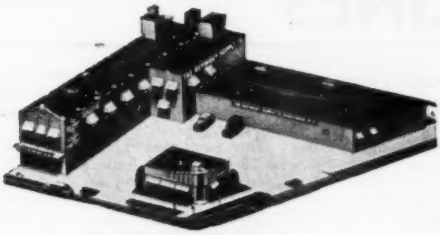

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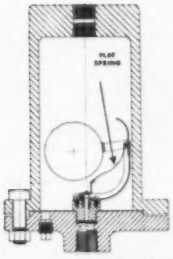

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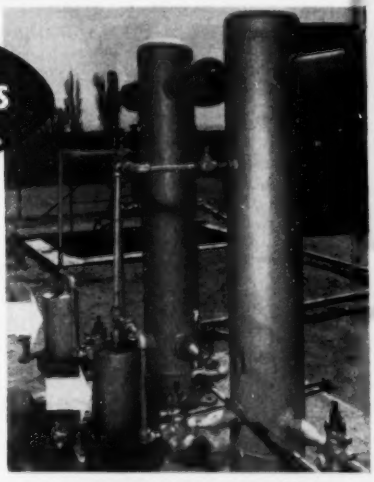

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PIPE LINES

Gulf-Michigan Drops Plans To Lay 680-Mile Gas Trunk

WASHINGTON. — Gulf - Michigan Gas Transmission Corp., of St. Louis, has abandoned its plans to build an $85,000,000, 680-mile natural-gas trunk line from Monroe, La., to Michigan City, Ind. *(The Oil and Gas Journal, March 29, 1951, page 166).*

The company, formed a year ago, withdrew its application for construction of line, which had been pending before the Federal Power Commission, due principally to inability to obtain an adequate supply of gas for the facilities.

The proposed system would have served the Chicago area through a connection in Indiana with Michigan-Wisconsin Pipe Line Co. and the St. Louis area through a lateral line off the main system.

Initial capacity was scheduled to be 350,000,000 cu. ft. of gas daily, 200,000,000 cu. ft. of this amount for delivery to Michigan-Wisconsin, the remainder to the St. Louis area.

Original plans called for supplies of gas to come from reserves dedicated to United Gas Corp. interests. Gulf-Michigan planned to receive the gas at Monroe through a connection with United Gas Pipe Line Co.

South Georgia Natural Gas Planning 339-Mile System

WASHINGTON.—South Georgia Natural Gas Co. has asked the Federal Power Commission to approve construction of a 339-mile natural-gas-transmission system in Alabama, northern Florida, and southwestern Georgia.

The new system, ranging from 2 to 12 in., would have a delivery capacity of 45,000,000 cu. ft. per day. Its main trunk would connect with Southern Natural Gas Co.'s system in Lee County, Alabama, and extend southeast to near Albany, Ga. A lateral would be laid from here to Tallahassee, Fla.

Construction cost is estimated at $8,273,064. South Georgia said that Southern Natural has agreed to make available a maximum of 19,500,000 cu. ft. of gas per day for the proposed system.

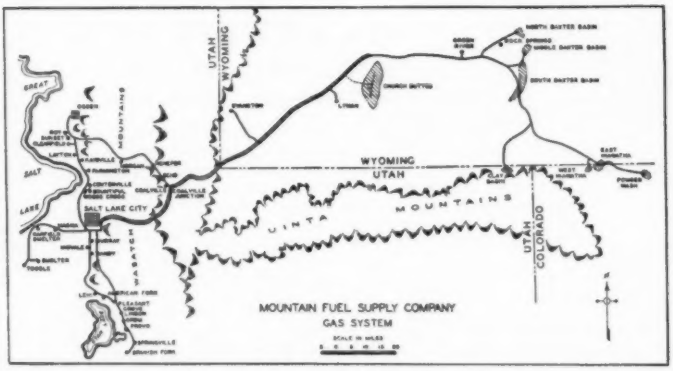
Southern Natural recently filed with the commission for authority to boost delivery capacity of its system by 350,000,000 cu. ft. per day. Both Southern Natural and South Georgia have headquarters in Birmingham.

FPC dismissed an application for a similar expansion by South Georgia last May, saying that the company then had no immediate prospect of a firm gas supply.

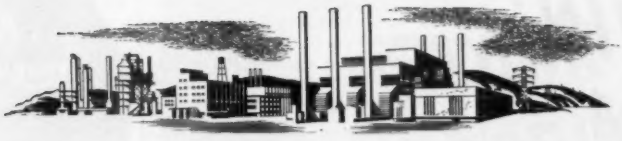
Boost in System Capacity Sought by Texas Illinois

WASHINGTON. — Texas Illinois Natural Gas Pipeline Co., Chicago, is seeking Federal Power Commission approval of an expansion in compressor units on its main line which would raise the system's delivery capacity 150,000,000 cu. ft. per day.

The proposed program involves



***MORE GAS TO SALT LAKE.**—Mountain Fuel Supply Co.'s recent discovery of a new gas sand in its East Hiawatha field in Moffat County, northwestern Colorado, and the belief that the sand underlies a large area have influenced the company to plan a new 100-mile transmission line from this area to Church Buttes, Wyo. W. T. Nightengale, president of the firm, said Mountain Fuel will apply for permission to build the line if two confirmation tests, a mile to the northeast and a mile to the southwest, are successfully completed. The company's present lines from northern Colorado to Church Buttes on its system to the Salt Lake City area are already carrying capacity loads, Nightengale said.*



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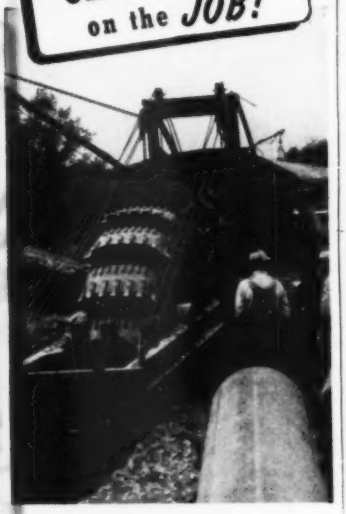

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construction of six new compressor stations and the addition of more horsepower at existing stations sufficient to raise capacity from the presently authorized 374,000,000 cu. ft. to 524,000,000 cu. ft. daily.

Construction of a suspension bridge across the Mississippi River and of lateral lines to hook up additional gas reserves would bring over-all cost of the expansion to about $52,882,000, the company said.

The six new stations each would have seven 2,000-hp. compressor units, while two of the same size units would be added to each of five existing stations. This would boost total compressor capacity on the system by about 104,000 hp.

The suspension bridge, accommodating two 30-in. lines, would be located near the company's present underwater crossing north of Jackson, Mo.

Texas Illinois told the commission that the additional capacity would be used to supply presently authorized and previously proposed customers and the proposed underground-storage project of Natural Gas Storage Co. of Illinois in Kankakee and Iroquois counties, Illinois.

Safety Code Advocated to Meet Atmospheric Hazards

HOUSTON. — Pipe-Line electrical engineers were urged here recently to develop a code of safety practices to meet atmospheric hazards existing in pipe-line stations.

Speaking before the Pipeliners Club of Houston, Merritt A. Hyde, Westinghouse Electric Corp., said standards for the code could be determined within the framework of the National Electrical Code, which would be valuable for stabilizing station design.

In order to achieve maximum safety in a new station, Hyde said, the pipe-line electrical engineer should participate throughout the entire period of designing station facilities in order to establish an appropriate basic station plan and coordinate electrical features with other phases of the project.

Hyde outlined types of motors for installation in pump rooms including explosion-proof and force-ventilated motors, which he considers safe for such service when they are equipped with proper protective facilities. More than 100 force-ventilated units ranging up to 3,000 hp. are now in operation or under construction, Hyde said.

In outdoor locations, explosion-proof, weather-proof, and fancooled types of units have been installed frequently. Booster units in outdoor installations do not exceed 400 hp. There is no trend toward using outdoor installations for main-line service, he said.

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trol rooms has eliminated atmospheric hazards, Hyde said, control equipment which is not explosion-proof is being used to an increasing extent.

Westcoast Revises Plans to Serve Pacific Northwest

WASHINGTON.—Westcoast Transmission Co, Inc., Wilmington, Del., has revised its plans for a natural-gas-transmission system to serve the Pacific Northwest and has filed the amended application with the Federal Power Commission.

The company's original plan called for construction of two lines—one from near Sumas, Wash., on the Canadian boundary to Portland, Ore., the other from Osoyoos, B. C., to serve Spokane and the atomic-energy plant at Hanford, Wash. This project would have cost about $25,690,000 and would have had an initial capacity of 104,000,000 cu. ft. daily, with a scheduled capacity of 221,000,000 cu. ft. daily in 5 years.

Westcoast's amended plan proposes construction only of the Sumas-Portland line, which together with lateral lines, would make up a 349-mile system. The project, including one compressor station, would have an initial capacity of 80,000,000 cu. ft. of gas daily and would cost about $17,142,000.

Westcoast still would receive gas at the international boundary from its Canadian associate, Westcoast Transmission Co., Ltd., which would obtain it from fields in Alberta and British Columbia. The latter firm also would supply gas to Trans-Northwest Gas, Inc, which is expected to file an application with FPC for authority to build a line to serve Spokane and the Hanford plant.

Hearings on the application already had been scheduled for April 8 in Washington.

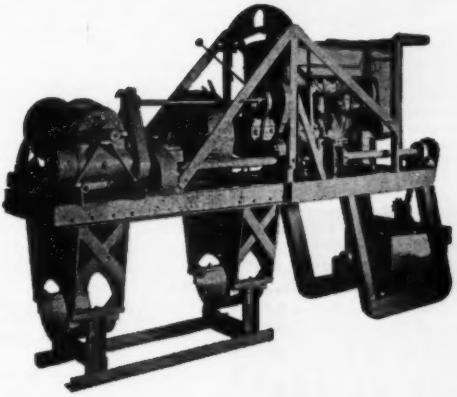
Lone Star Surveying for Line to New Texas Gas Area

DALLAS.—Lone Star Gas Co. has surveys under way for a proposed 35-mile, 12-in. pipe line which will tap a new gas-producing area in southeastern Schleicher County.

Julian L. Foster, general superintendent of Lone Star's transmission division, said pipe for the line has been approved by Petroleum Administration for Defense, and delivery is expected during the third quarter of 1952.

Construction of the line is expected to require from 30 to 60 days and cost is estimated around $600,000.

Wells to be served are on the Duke Wilson and W. A. Miller ranches. The new project will be a south extension from the southern terminus of Lone Star's 48-mile, 8-in. pipe line which carries gas from Page field to San Angelo.



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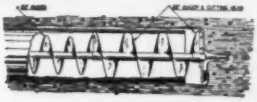

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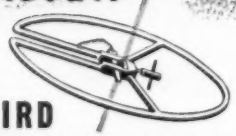

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Among the Drilling Contractors

Drilling Pick-up Shown By Active Rig Increase

A further pick-up in drilling activity was indicated during the week ended March 24 by another increase in the number of rotary rigs operating in the United States and western Canada regions. It was the second consecutive week following a period of several months of declining activity that an increase was reported. The 2,908 rigs reported running during the week represented a gain of 16 rigs over the total working the previous week and 69 over the low mark of the season two weeks ago.

Two areas, Oklahoma and the Gulf Coast, reported fewer rigs running but these decreases were more than offset by marginal increases in all other districts. The increase in western Canada boosted the number of active rigs there to an all-time record of activity with 186 rigs in actual operation. The over-all total was 557 greater than at the same time a year ago.

ACTIVE ROTARY RIGS*

(United States and Western Canada)

Area—	Week ended 3-24-52	Change week ended 3-17-52	Change week ended 3-26-51
Gulf Coast	602	— 7	+ 71
N. & W. Tex.-N. M.	1,058	+ 3	+233
Ark.-N. La.-E. Tex.	156	+ 1	+ 7
Oklahoma	326	—15	+ 25
Kansas-S. Nebraska	165	+15	+ 12
Illinois-Eastern	79	+ 4	+ 35
Rocky Mountains	177	+ 7	+ 69
Pacific Coast	159	+ 1	+ 19
Total United States	2,722	+ 9	+471
Western Canada	186	+ 7	+ 86
Total	2,908	+16	+557

*Courtesy Hughes Tool Co. Trends in drilling activity in the United States and the Pacific Coast and Illinois-Eastern areas are shown on pages 166 and 167.

Penrod Drilling Co., Shreveport, has contracted for a deep well which the Cotton Valley Operators Committee will drill in the Cotton Valley field, Webster Parish, northern Louisiana. The well, contracted to 9,200 ft., is designated as 1 Coyle, with location in 1-21n-10w.

Rainbow Drilling Co., El Dorado, Ark., has contracted for two additional wells to be drilled for Curtis Kindard, El Dorado independent operator. One is a Smackover lime test, 1 Taylor, located north of Strong, southern Union County, Arkansas, in the SE NE NW 28-18s-12w. It is about a mile west of a long-abandoned wildcat Smackover lime producer, completed in 1944. Pay is expected at 6,500 ft. The other is a 3,500-ft. test, 1 McGough, at the north end of the Urbana field, in the NW SW SE 34-17s-13w.

R. J. Wixson Drilling Co., El Dorado, Kans., has the contract for a new wildcat operation which Wilson Oil Co. is starting in the South Potwin area, western Butler County, Kansas. Location is for 1 Wilson, in the NE NW SE 15-25-4e.

Loffland Brothers Co., Tulsa, is starting another 9,000-ft. well for Amerada Petroleum Corp. in the Bayou Des Allemands field, Lafourche Parish, coastal Louisiana. It will be Amerada's 36 Gheens, in 56-15s-20e.

Derris Ballew, Natchez, Miss., has contracted with The Texas Co. for a 10,500-ft. wildcat test to be drilled at 2 Gaylord, 4-8s-4e, on the Northeast Port Vincent prospect, Lafourche Parish, coastal Louisiana.

Longhorn Drilling Corp., San Antonio and Three Rivers, Tex., has taken on two additional deep-drilling contracts in South Texas. One is for a projected 8,900-ft. well to be drilled for Tide Water Associated Oil Co. at 1 A. J. Berchenhoff, in the Victor Blanco Survey, Willbern field, Goliad County. The other is a projected 9,000-ft. wildcat test to be drilled for The Texas Co. at 1 Douglas W. Rhode, on the Rhode ranch, 25 miles west of George West, McMullen County.

Patco Drilling Co., Stillwater, Okla., is starting another well for Magnolia Petroleum Co. in the Masham area, northwestern Pawnee County, Oklahoma. The new operation, 1 Ferguson, NW NW NE 34-23n-4e, is southeast of an extension well now being completed by the same operator.

E. A. Rumley Drilling Co., Oklahoma City, is moving a rig to a wildcat location 7 miles southeast of Noble, Cleveland County, Oklahoma, where it will drill a Wilcox sand test for Jay Simmons of Dallas. Location is for 1 Mason, C SW SE 3-7n-1w. Contract is for 7,200 ft.

Glenn Gillespie & Sons, Cushing, Okla., are doing the drilling on a new wildcat operation which Charles W. Oliphant of Tulsa has under way south of the Drum Creek pool in western Osage County. Location is in the SW SW SE 28-25n-4e. Hole will be carried to the Mississippian, expected around 3,400 ft.

R. W. Rine Drilling Co., Wichita, is drilling another well for Lion Oil Co. in the Greasewood area of Weld County, Colorado. It is 1 Juhl, C NE NE 14-6n-61w, an outpost location.

J. & L. Drilling Co., Wichita, is moving a rig to a wildcat location just south of the Nebraska line in northern Logan County, Colorado, where it has a contract with McDermott & Barnhart for a "J" sand test at 1 Fehringer, in SW SW SW 34-12n-52w. It also will drill another test for Eddie Fisher and associates in the Messex area, Morgan County, Colorado, as soon as a rig is available. The latter operation will be 1 Stoner. Location is in the SE SE SE 14-6n-55w.

George & Wrather Drilling Co., Mount Carmel, Ill., is starting a test for Carl Bazell and Otis Roberts at a wildcat location, 1 Miller, SW SW SW 27-6n-57w, in northern Morgan County, Colorado.

Zack Brooks Drilling Co., El Dorado, Ark., has a new well under way in the Sibley field, Webster Parish, northern Louisiana, where it is drilling for Houston Oil Co. and Donald Goodwill, Jr. Location is for 1 Braswell, in the C NE NW 8-17n-9w. It is a Travis Peak test.

Mora Drilling Co., Tulsa, is drilling for Fordee Rhoades Oil Co. and R. L. Kemp at 1 Wright, NE NE SW 23-17n-6e, a newly started test in the West Shamrock district, Lincoln County, Oklahoma.

Montgomery Drilling Co., El Dorado, Ark., is drilling for Nichols & Clay Co. at 1 Federal Land Bank, a Tuscaloosa exploratory test, located in the SE NE NE 32-17n-7e, 3½ miles south of Rayville, Richland Parish, northeastern Louisiana. Objective is expected at 2,400 ft.

Wheless Drilling Co., Shreveport, has a new 13,000-ft. contract in the Gibson field, Terrebonne Parish, coastal Louisiana, where it is drilling for Shell Oil Co. Latest operation is Shell's 23-B Realtors.

Dirickson-Lewis Drilling Co., Tulsa, has a rig running at a new operation on the north flank of the Langston pool, Logan County, Oklahoma, where it is drilling for D. & L. Oil Co., an affiliated operating company. The test, 1 Moss, NE NE SE 11-17n-1w, is projected to 5,200 ft.

C. M. Bagley, Shreveport, is the contractor on a Tokio sand wildcat test which G. R. Stevens, also of Shreveport, is starting in the Princeton area, Bossier Parish, northwestern Louisiana. The test is being drilled as 1 J. D. McDade estate with location in the NE NE NE 5-18n-11w.

Dyer & Smith, Lafayette, La., will drill a 10,500-ft. test for British-American Oil Producing Co. at Anse La Butte, St. Martin Parish, southern Louisiana. It will be the operator's 1 Barry, located in 66-9s-5e.

Anschultz Drilling Co., Wichita, is getting started on three new wildcat tests, two for Pure Oil Co. in Weld County, Colorado, and one for Bay Petroleum Corp., in western Graham County, Kansas. Pure's jobs are 1 Duell, SE SE SW 1-8n-61w, 6 miles southeast of Sligo, and 1 State, C NW NW 12-5n-62w, 6 miles southwest of the Greasewood area. The Bay test is 1 Schmied, NW NW NE 21-8-25.

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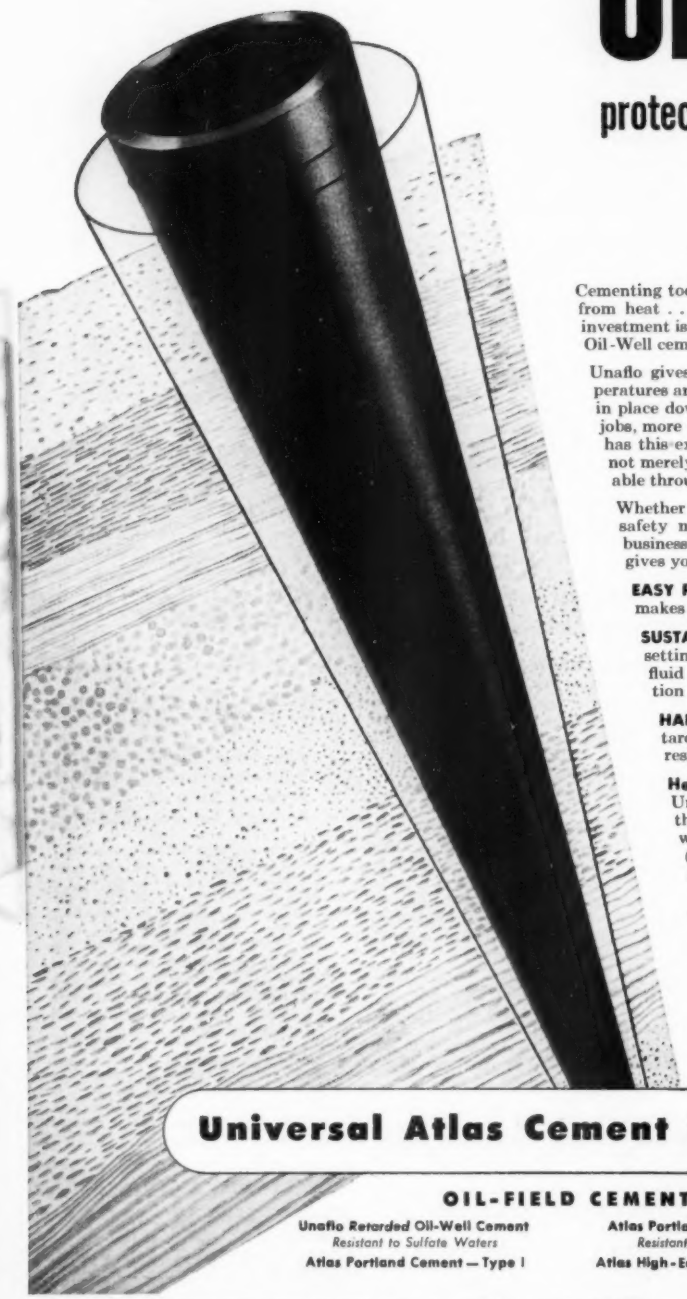

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REPORTS ON

Exploration and Drilling

Morphology of the Bloop

A NEW system of classifying "structures" in areas such as the Michigan and Illinois basins, where the slightest wiggle in subsurface contours may lead to the development of a first-class prospect, has been offered to the industry.

This new system has not been officially adopted by any organization and it is unlikely that it ever will be. However, because the system's nomenclature so aptly describes the kinds of subsurface features so often developed in the less-distorted basins, the names are expected to become part of every frustrated geologist's vocabulary. Due to its interest among oil seekers, the new classification is briefly described here as a refreshing, if not monumental, contribution to the literature.

Perhaps one of the outstanding features of this new classification system is that it is a definite reversal of the trend toward classifications that have resulted in such words as miogeosyncline, eugeosyncline, exogeosyncline, zuegogeosyncline, epieugeosyncline, taphrogeosyncline, and paraliageosyncline. (Don't go back to the farm just because you can't explain even one of these words because never have there been so many names about which so few have known so much.)

The petroleum geologist should be familiar with all kinds of structural types that occur in sedimentary rocks. (Without a thorough knowledge of the kinds of structures that might be expected in the sediments of a region under investigation it would be extremely difficult for a geologist properly to interpret the subsurface map which he has built up by studying outcrops and various kinds of well logs, and by completely disregarding contrary paleontological and geophysical data.) Realizing this fact, G. O. Winston and L. G. Pope, geologists in Carter Oil Co.'s district office at Grand Rapids, Mich., prepared "A Manual of Structural Interpretation." This manual presents what the authors call "the phylogeny and morphology of the bloop."

Winston and Pope define a bloop as a feature in an area where subsurface contours spread enough to accommodate a small closure. They point out that these small closures

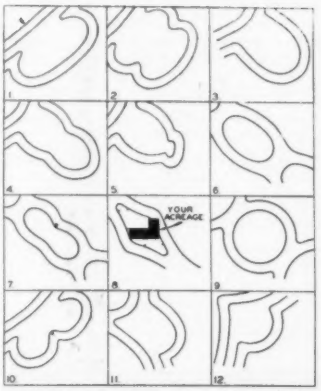

Plate A. Figs. 1-12.

when idealized are oval in shape and heretofore have been called "goose eggs," "footballs," and "pumpkin seed highs," with the latter name being reserved for highs which slide across the map when drilled. After many heart-breaking years of study and scheming, a preliminary (and probably final) classification of bloops was forced upon the unexpectant fraternity of geologists by these two scientists.

Here are their classifications (see Plate A, Figs. 1-12): (1) A bloop in its simplest form. (2) A bleep, or double bloop. (3) A blob. (4) A blub, or double blob. (5) The small irregularity on the otherwise normal bloop is called a "blip." (6) A blimp (further defined as a closed contour without control). (7) A blump, or double blimp. (8) A blunder. (In this case, the classifying geologists add, if more than one contour is closed in the low, this form becomes a blot, or double blunder.) (9) A balloon. (The classifiers point out that the regularity of this form shows lack of imagination on the part of the mapping geologist.) (10) A brape (a bloop that has been forced). (11) A blug. (12) Here the authors of this masterpiece diverge momentarily from their serious manuscript and just call this form "ugh!"

These classifications with their descriptive names will add a note of authority to the recommendations of the geologists who so painfully develop a sure-fire prospect in the center of a square formed by four closely spaced dry holes. Such a magnificent piece of work also proves that the science of geology is still in its infancy—that the younger geologists must not get the idea that all the basic work has been done, or all of the fun had.

Philip C. Ingalls.

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

ROCKY MOUNTAIN AREA.—Shell Oil Co. is moving in material to take 16 C. F. Green "A," NE NW NW 30-9n-53w, Mount Hope pool, Logan County, Colorado, to granite. This will be the first test below Lower Cretaceous, productive in Logan County pools, in this county, and the first test to granite in any field in the Colorado portion of the Denver-Julesburg basin.

SOUTH DAKOTA.—Casing has been cemented at 5,756 ft. at Shell Oil Co. 1 Winter, C NW SW 11-22n-19e, Corson County wildcat. Madison has been perforated from 5,585-5,615 ft., and drill-stem test from 5,578-5,610 ft. recovered 3 gal. of mud with pin points of live oil. Other cores down hole showed oil staining.

PERMIAN BASIN.—M. A. Grisham and Standard Oil of Texas were making second test at 1 Grisham fee, Culberson County discovery. On test at 9,030-54 ft. the wildcat blew an estimated 40,000 M.c.f. of gas daily. This is first production in the Delaware basin below the Delaware formation, and is believed to be in Devonian.

Mississippi

Adams Wilcox Strike is In Completion Stages

JACKSON.—What is believed to be one of the better Wilcox strikes in Mississippi is completing at J. P. Evans at al 1 A. K. Ellis, 12-5n-2w, located between Kingston and Wayside fields, Adams County. Operator perforated casing at 6,507-11 ft. and swung 2½-in. tubing at 6,505 ft. Through 10/64-in. choke, the well flowed 211 bbl. of 37.8°-gravity oil per day under tubing pressure of 540 psi. and casing pressure of 430 psi. This wildcat logged 20 ft. of saturation at 6,506-26 ft. in the top part of a thick Wilcox sand. Another oil sand was also indicated by sidewall cores at 6,456-62 ft. and 6,490-92 ft.

Lion Oil Co. is coring below 16,180 ft. in sand at its deeply watched Smackover wildcat in Rankin County. This sand body was topped 15,997 ft. to present depth which makes a total of 183 ft. of solid sand that has been cored. The top 90 ft. was uniformly very porous and permeable, but the bottom 90 ft. has had numerous streaks that were dolomitic and tight. It is firmly believed that the sand has enough porosity and permeability to produce, but it is still unknown just what kind of gas or fluid occupies the pore space. Most observers believe the sand carries either gas or salt water and not oil. No testing will be done until a total depth is reached and a liner is cemented.

In Escambia County, Alabama, Humble Oil & Refining Co. is coring in its third confirmation try to newly discovered Pollard field. The venture, 1 A. Lister, located immediately south of the discovery well, is down to 4,950 ft. in the Eutaw formation. Oil sands, if there are any, are expected to be reached between 5,900-6,000 ft.

Caroline Hunt Trust Estate has abandoned 1 U. S. A., 18-5n-2e, confirmation attempt in the newly discovered Knoxville Tower field in Franklin County, Miss. Several attempts to squeeze off the salt water encroachment in the thin oil section proved futile. Final test yielded 2 per cent oil and 98 per cent salt water.

MISSISSIPPI WILDCAT FAILURES

Jefferson County: Kemp Drilling Co. 1 W. M. Drake, 11-8n-1w, dry, TD 6,505 ft.
Leflore County: Sneed Bros. 1 J. A. Williams, 7-18n-2w, dry, TD 6,074 ft.
Wayne County: I. P. LaRue, Jr., 1 U. S. A., 6-6n-7w, dry, TD 8,072 ft.

ALABAMA WILDCAT FAILURES

Franklin County: Loveridge & Heath 1 Thorn, 18-6s-13w, dry, TD 2,403 ft.
Washington County: S. P. Borden 1 White Smith Lumber Co., 19-5n-2w, dry, TD 7,143 ft.

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South Louisiana

Lake des Allemands Area Has Assured Discovery

NEW ORLEANS.—A new oil pool discovery seems assured at Houston Oil Co. of Texas 1 State Lease 1838, 16-13s-19e, St. John the Baptist Parish. From perforations at 11,196-11,208 ft., the well flowed at the rate of 55 bbl. of oil daily through 10/64-in. choke. At last report, operator was running tubing for completion attempt. This wildcat, located in the Lake des Allemond area, is bottomed at 12,447 ft. with casing cemented at 11,266 ft. Previously, the well showed some indications of oil at 9,400 ft. but core analysis was not good.

Magnolia Petroleum Co. 1 Four C unit, 32-3s-9w, wildcat in the Burt area of Beauregard Parish, tested 40 bbl. of distillate per day from perforations at 11,912-29 ft. Bottom-hole flowing pressure registered 2,800 psi. and shut-in pressure was 4,640 psi. Hole is bottomed at 14,238 ft. with 5-in. casing set 10 feet off bottom.

The Texas Co. has completed 3 Brandish-Johnson, 20-18s-26e, Plaquemines Parish, for a small oil discovery. On potential test, the well flowed 18 bbl. of 39°-gravity oil daily plus 5,830,000 cu. ft. of gas through ¼-in. choke. This wildcat, located in the Magnolia area of the parish, is bottomed at 13,074 ft. with casing set at 12,104 ft. Production is from perforations at 10,937-49 ft.

In Lake Washington area of Plaquemines Parish, John W. Mecom-Freeport Sulphur Co. 1 E. Cockrell et al, wildcat, flowed approximately 180 bbl. of oil daily on the last of recent tests. The well, perforated from 11,872-11,938 ft., flowed through 12/64-in. choke with tubing pressure of 3,250 psi. Additional tests will be run when tank batteries are erected.

Cities Service Oil Co. has logged additional pay at 1 Delta Securities Co., 37-17s-18e, Terrebonne Parish discovery prospect. The wildcat logged approximately 150 ft. of gas-distillate pay between 10,720-12,120 ft., and an additional 45 ft. of possibly pay between 12,624-709 ft. Venture is drilling below 12,974 ft.

The California Co. 1 George Montgomery, 85-12s-19e, wildcat in St. Charles Parish, is reported to have logged approximately 70 ft. of gas-distillate sand and 10 ft. of oil sand. The well is being drilled tight and is reported to be at total depth of 11,600 ft. awaiting orders.

SOUTH LOUISIANA SUCCESSFUL WILDCAT

Cameron Parish: Gas-condensate discovery —Kerr-McGee Oil Industries, Inc., &

Stanolind Oil & Gas Co. 1 C. F. Henry, 29-14s-9w, TD 9,428 ft., perf. 9,356-66 ft., IP 71 bbl. of condensate, 52.1° gravity, TP 3,450 psi.

SOUTH LOUISIANA WILDCAT FAILURES

Beauregard Parish: Shell Oil Co. 1 Edgewood Land & Logging Co., 32-7s-9w, dry, TD 6,205 ft.

Cameron Parish: Caroline Hunt Sands 1 B. F. Rutherford, 31-14s-7w, dry, TD 12,064 ft.

Livingston Parish: The Texas Co. 1 Hammond Lumber Co., 37-7s-5e, dry, TD 8,819 ft.

Pointe Coupee Parish: The Texas Co. 1 Mrs. Florence Cranor Bateman et al, 86-5s-8e, dry, TD 10,700 ft.

St. Bernard Parish: John L. Loeb 1 Godchaux Sugars, Inc., 80-14s-14e, dry, TD 11,520 ft.

Shell Oil Co. 2 St. Lse. 1498, 16-19s, Breton Sound, dry, TD 8,001 ft.

Texas Gulf Coast

Colorado County Has New Gas-Condensate Discovery

HOUSTON.—Robert Mosbacher has completed a new gas-condensate discovery 1½ miles west of Englehart field in Colorado County. Operator's 1 Nebbe flowed 1,000,000 cu. ft. of gas per day plus 40 bbl. of condensate through ¼-in. choke from perforations at 8,785-98 ft. and 8,810-15 ft. Tubing pressure registered 2,100 psi. Well spots in SA&MGRR Survey, Abstract 539, Section 17.

New pay has been opened in Fulshear field, Fort Bend County, at Ginther, Warren & Ginther 1 Mrs. Ethel Tucker Christian. From perforations at 7,512-15 ft., the well flowed 116 bbl. of 36.6°-gravity oil daily under tubing pressure of 950 psi. Hole is bottomed at 7,850 ft. and operator set 5½-in. production string at 7,578 ft.

Fifteen miles northeast of Buna in Newton County, Houston Oil Co. of Texas & American Republics Corp. completed 1 J. H. Kurth, Jr., Trustee et al, rank wildcat, for 21,000,000 cu. ft. of gas per day plus 100 bbl. of 61.8°-gravity condensate. Production is from perforations in the Yegua Cockfield at 7,462-66 ft. The new discovery is located in H & T C Survey 42, A-1091.

Potential gage has been run at Brazos Oil & Gas Co. 1 M. O. Sledge unit, Waller County oil discovery in William Baird Survey, 7 miles northeast of Hempstead. From perforations at 10,147-57 ft., the well flowed 124 bbl. of 50.4°-gravity oil daily through 13/64-in. choke. Tubing pressure gaged 1,275 psi. on test. Total depth of the new discovery is 11,008 ft. width 7-in. casing cemented at 10,472 ft.

New gas pay has been established in Porter field, Karnes County, at Sunray Oil Corp. B-2 H. T. Sellers. From perforations in the Pettus at 4,072-75 ft., the well flowed 8,200,000 cu. ft. of dry gas daily on open flow potential. Production is from a different fault block from other Pettus zones in Porter and South Porter fields.

Anderson-Prichard Oil Corp. has set 5½-in. production string in 1 R. A. Johnson, wildcat 1 mile north of Freisburg production in Colorado County, to test shows indicated on drill-stem tests. Gas-condensate was recovered on 2 tests conducted at 9,146-9,226 ft., and 9,650-85 ft. A deeper sand at 10,374-94 ft. showed gas and fluorescence. The prospect is located in Edward Ruhman Survey, Abstract 479.

TEXAS GULF COAST (DISTRICTS 2 AND 3) SUCCESSFUL WILDCATS

Hardin County: new pay at Beech Creek—Harry Hampton 1 Olive Sternenberg, Sec. 194, John Taylor Sur. A-561, TD 7,227 ft., perf. 6,235-36 ft., IP 48 bbl. oil per day, ½-in. choke, 46° gravity, TP 2,100 psi.

Harris County: oil discovery—M. T. Halbouty & Sorell & Sorelle 1 W. D. Rogers unit, M. Duncan Sur. A-17, TD 9,957 ft., perf., 8,948-64 ft., IP 120 bbl. oil per day, ¼-in. choke, 33° gravity, TP 350 psi.

Jefferson County: new pay at Big Hill—Adams & Haggarty 1 Paraffine Oil Co., T&NO RR Co. Sur. 174, A-493, TD 8,311 ft., Marginulina 8,240-47 and 8,263-72 ft., IP 34,000,000 cu. ft. of gas daily plus 12 bbl. of distillate per million cu. ft., 45.8° gravity.

Waller County: oil discovery—Brazos Oil & Gas Co. 1 M. O. Sledge unit, William Baird Sur. A-10, TD 11,008 ft., perf. 10,147-57 ft., IP 124 bbl. oil per day, 13/64 in. Choke, TP 1,275 psi., 50.4° gravity.

Wharton County: ney pay at East Mauritz—Johnson & Appling 1-A Kountze & Stewart "A," M & C Sur. 15, TD 6,795 ft., perf. 6,790½-94 ft., IP 132 bbl. oil per day, 8/64-in. choke, TP 1,100 psi., 36° gravity.

TEXAS GULF COAST (DISTRICTS 2 AND 3) WILDCAT FAILURES

Bee County: Renwar Oil Corp. 1 Wilhelmina Stewart, Chas. Clark Sur. A-135, dry, TD 7,000 ft.

Brazoria County: L. M. York 1 A. Farrer et al, W. H. Dennis Sur. A-514, dry, TD 8,735 ft.

Colorado County: R. N. Ranger 1 David Winterman et al, T.&N.O. Sur. A-682, dry, TD 9,710 ft.

Goliad County: Dallas Husky 1 R. P. Lucas Est., William P. Miller Sur. A-193, dry, TD 3,535 ft.

Jackson County: Charles H. Osmond et al 1 "L" Ranch, James Pierce Sur. A-250, dry, TD 9,995 ft.

Liberty County: John W. Mecom 1 Kirby Lumber Corp., Hugh Mdans Sur., dry, TD 8,613 ft.

Orange County: Pacific Production Corp.—Harry Hurt 1 Millie Caron Sterling, William Dyson Sur. A-10, dry, TD 5,614 ft.

Victoria County: G. W. Weaver 1 M. E.

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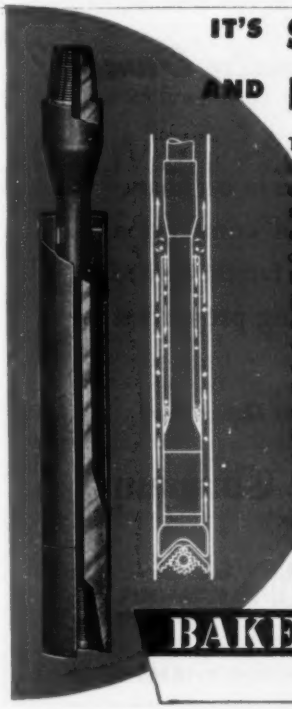
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Wharton County: Grubb & Hawkins 1 Emil Cihal, J. W. Nueval Sur. A-314, dry, TD 5,780 ft.

Eastern Texas

Paluxy Oil Discovery Is Confirmed In Wood County

DALLAS.—L. A. Grelling 2 O. M. Childress, confirmation well to the recent Paluxy oil discovery in Pine Mills field of southern Wood County, has been completed for a flowing potential of 396 bbl. of oil a day, through ¼-in. choke. Production perforations were from 7,812-52 ft. Location is southeast of the discovery. The same operators prepared to drill ahead after running surface pipe on the 3 Childress, located south of the No. 2 well.

Meanwhile, Superior Oil Co. 16 D. V. Wagoner, north outpost to the Paluxy discovery, in the J. R. Jordan Survey, had total depth at 7,879 ft., with no shows. The well was said to have run about flat with the discovery, but a core at 7,826-79 ft. found the sand had shaled out.

A. O. Phillips 1 Mary Saner, wildcat 3 miles east of Pine Mills, was drilling below 7,900 ft., with no shows.

In Navarro County, Humble Oil & Refining Co. 1 First National Bank of Corsicana, Caradine Survey, recovered 210 ft. of gas-cut mud, with a light distillate show, on a 1-hour test at 6,790-6,844 ft. in a broken limestone section.

EAST TEXAS (DISTRICTS 5 AND 6) WILDCAT FAILURES

McLellan County: The Perry Co. 1 E. M. Adams, J. A. Manchaca Sur., dry, TD 1,235 ft.

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Wood County: B. F. Phillips 1 W. H. Cash, Hardeman Sur., dry, TD 5,690 ft., Woodbine 5,315 ft.

Louisiana-Arkansas

Wet Gas Shows Tested at Bossier Parish Wildcat

SHREVEPORT.—Continental Oil Co. tested shows for a wet gas producer at 1 T. S. Goodwin, 29-23n-12w, west of Redland in Bossier Parish, in the Travis Peak. Gas surfaced in 14 minutes on a 1-hour drill-stem test from 7,342-65 ft. Recovery was 100 ft. of condensate, 200 ft. of gas and condensate-cut mud and the water cushion cut with gas and condensate. The wildcat is drilling ahead of 7,582 ft. for a Smackover test.

Michael T. Halbouty and Greyhound Drilling Co. have completed and are testing the apparent confirmation well in Rockpoint field, Caddo Parish. The 1 Kirby, 13-20n-15w, has been completed for testing and is flowing without gage. Flow is from 3,716-26 ft. in Kilpatrick sand. Recovery on a drill-stem test of the zone was 177 ft. of oil and gas-cut mud. Casing was set to 4,748 ft., total depth being 4,750 ft. in Pettit lime. The Pettit was cored 4,670-716 ft. with recovery of tight sand with oil shows.

An official open flow potential of 25,500 M.c.f. of gas daily has been announced for Bert Fields 1 Sentell, 35-19n-14w, 6 miles north of Shreveport. The 1 Sentell is the discovery well for the new Sentell gas-distillate field. Flow is from perforations 8,324-46 ft. in Bodcaw sand.

When originally completed last September the well had an unofficial open flow potential of 37,000 M.c.f. of gas, with a gas-distillate ration of 16 bbl. per million cubic feet of gas. Official test was delayed until an outlet could be secured. The 1 Sentell has been allowed 5,355 M.c.f. of gas daily by conservation officials.

Arkansas.—Rapid development is taking place on the Columbia County side of Springhill field. Shell Oil Co. has completed 2 Browning-Burns unit for a reported flow of 160 bbl. of oil daily from perforations at 3,102-14 ft. The well is located 330 ft. southeast of 1 unit, which opened the play resulting in the shallow Springhill field.

Stanolind Oil & Gas Co. has spotted location for a new deep venture in the Fort Lynn area, Miller County. The 1 Oscar Kechitzky is about 3 miles northeast of Fort Lynn field in 9-18s-27w. Proposed depth is 6,500 ft. in Rodessa.

Bottomed at 10,547 ft. is Stanolind 1-B Miller Land & Lumber Co., C SW SE 17-18s-27w, 11,000-ft. Smackover test in the field area. Top of Buckner was called at 10,460 ft., and operator is fishing for stuck drill pipe.

W. G. Skelly is coring ahead at 10,053 ft. at 1 Dickson heirs, 36-19s-27w, proposed Smackover wildcat. One foot of sand with dead oil stain was found in core at 9,958 ft.

In new Horsehead field near Emerson Gulf Refining Co. has set surface pipe and is drilling for a testing depth of 6,000 ft. in Pettit at 1 Stonecipher-Foster Unit, near the discovery well, A-1 Sam J. McCollum.

The Texas Co. is drilling near 5,700 ft. at 1 Union Saw Mill Co. et al, 15-18s-24w. The tight wildcat is due for a testing depth of 6,700 ft.

LOUISIANA SUCCESSFUL WILDCAT

Claiborne Parish: Magnolia Petroleum Co. 1 Wasson, C NW SE 13-22n-5w, flowed 336 bbl. 50.8°-gravity oil from Smackover 10,194-10,206 ft., TD 11,188 ft.

LOUISIANA WILDCAT FAILURES

Catahoula Parish: Barnett Serio et al 1 Dee Taylor, 7,450 ft. S and 1,750 ft. E NWc Sec. 5 in Sec. 43-8n-5e, dry, TD 5,020 ft.

Concordia Parish: R. A. Campbell et al 1

P. A. Sternack-Dale, 353 ft. N and 661 ft. E SWc NE SW 16-8n-9e, dry, TD 6,257 ft.

Madison Parish: Curtis A. Kinard et al 1 Chicago M&L Co., C NW SW 26-15n-10e, dry, TD 6,510 ft.

ARKANSAS SUCCESSFUL WILDCAT

Lafayette County: The California Co. 1 Burton, Jr., 660 ft. S and W NEc 9-18s-23w, pumped 108 bbl. 42.6° gravity oil from Cotton Valley 7,342-52 ft., TD 9,564 ft., PBTD 7,410 ft. (discovery tentatively called Canfield).

ARKANSAS WILDCAT FAILURES

Ashley County: Lion Oil Co. 1 Crossett Lumber Co. "A," 510 ft., S C SE SW 17-18s-6w, dry, TD 3,513 ft.

Ouachita County: C. A. Lee Drilling Co. 1 Graves, C W½ NE SW 8-14s-18w, dry, TD 2,220 ft.

ft., IP 3,600,000 cu. ft. of gas per day, ¼-in. choke.

Houston Oil Co. of Texas-American Republics Corp. 1 Temple W. West et al, Porcions 73, 74, 75, TD 6,703 ft., perf. 6,048-58 ft., IP 63,000,000 cu. ft. of gas per day plus an estimated 10 bbl. of distillate per million cu. ft., open flow.

McMullen County: Gas-condensate discovery—new pay at Hagist Ranch—Argo Oil Corp. 1 H. F. Fagan, R. U. Allison Sur. 467, A-1107, TD 10,876 ft., perf. 7,730-50 ft., IP 18,100,000 cu. ft. of gas per day plus 360 bbl. of condensate, open flow, 52.8°-gravity.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) WILDCAT FAILURES

Aransas County: F. William Carr 1 Winsor, Wm. Nettles Sur., dry, TD 8,508 ft.

Bell County: J. P. Bristow & Co. 1 J. G. Brock, Dan McKay Sur., A-1165, dry, TD 1,095 ft.

Brooks County: C. G. Glasscock & Hankamer 1 E. H. Maupin, E. A. Duwess Sur., Sec. 318, A-163, dry, TD 6,046 ft.

Duval County: C. H. Callahan 1 Gruy Est., S. G. Hayes Sur. 158, Cert. 100, dry, TD 3,356 ft.

Dunlap & Corning 1 Pauline Harter, Sec. 236, A-2062, dry, TD 4,608 ft.

Frio County: Forney & Winn & John Teagle et al 1 Emma F. Shiner, Larkin Nalls Sur. A-964, dry, TD 6,010 ft.

Guadalupe County: James H. Eddy 2 Norman A. Wundt et al, Robert Hall Sur. A-157, dry, TD 2,527 ft.

Sherman Nelson 1 Victor Vinyard, Gus Ghalwell Sur., dry, TD 1,168 ft.

Jim Hogg County: Armstrong & Cotton, Inc. et al 1-B Down Royalty Corp., El Javali Grant, Beer & Coffee Subd., Blk. 35, dry, TD 2,212 ft.

Jim Wells County: Baron Kidd 1 V. Gonzales, La Tinaja de Lara Grant, A-36, dry, TD 7,105 ft.

Southwest Texas

Bandera Rank Wildcat Has Been Abandoned

CORPUS CHRISTI.—Mikton Oil Co. has abandoned its rank wildcat in Bandera County located ½ mile west of Vanderpool. Operator's 1 Stelzer, which has been drilled "tight," was abandoned at total depth of 8,515 ft. One plug has been set near bottom, another at the base of the surface casing at 1,450 ft., and a bull plug at top of the surface casing. Mikton shot the wildcat recently with 400 quarts of nitroglycerin. Considerable excitement was created when the well was reported to have logged shows in the Pennsylvanian.

Pryor Dillard is completing a new oil discovery in Bell County 10 miles southeast of Temple in William Woodford Survey. The well, B-1 Safford, is pumping an estimated 50-75 bbl. of oil daily from the Buda lime at 1,090-1,103 ft. Top of the Buda was picked at 1,085 ft.

A new gas-condensate discovery is completing in Hidalgo County at The Texas Co. B-1 Mrs. Isabel Y. Garcia. Operator is now running 7-in. casing after recovering 5 ft. of distillate on drill-stem test at 4,329-38 ft. Bottom-hole flowing pressure registered 1,940 psi. in 15 minutes. New discovery is located in Anastacio Villarreal Survey, Abstract 85, Porcion 43.

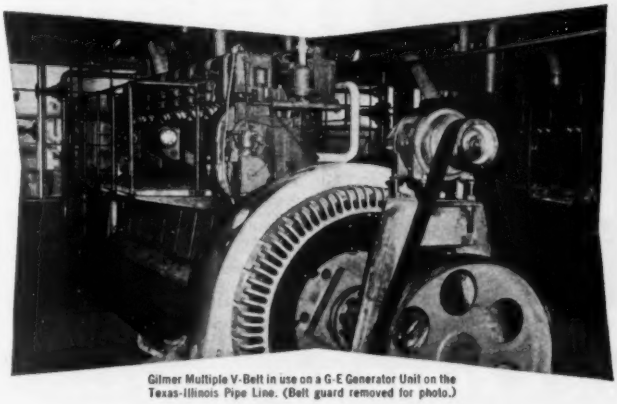
A new Reklaw oil reservoir has been opened 3½ miles southeast of Jourdanton, Atascosa County, at R. B. Wherry and C. A. Green 1 A. Terrell. Operators drilled the venture to 1,737 ft. and set production string on bottom. Perforations were effected at 1,696-1,712 ft. No gage has been reported on the well, however, a drill-stem test at this interval recovered 120 ft. of oily mud. The strike is located in CEPI & Mfg. Co. Survey, Abstract 936.

Aransas Fuel Oil Co. 1 Earnest Guedin, wildcat in San Patricio County 2 miles south-southeast of East Taft field production, flowed 20,000,000 cu. ft. of gas per day plus an estimated 20 bbl. of condensate per million cubic feet. Shut-in pressure was 3,000 psi. The well is producing from perforations at 8,821-41 ft. Location is in Jose M. Manchaca Survey, 2nd addition to Taft Farm Lands, Lot 5, Block 4.

West Sinton field, San Patricio County, has a new pay opener at Forney & Winn A-1 Robertson. From perforations at 1,311-17 ft., the well flowed 69 bbl. of oil daily through 5/64-in. choke under 75 psi. tubing pressure. Three separate pay zones are found within a radius of 60 ft. around the Robertson well.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) SUCCESSFUL WILDCATS

Hidalgo County: Gas discovery—C. G. Glasscock & Shelby Walker 1-B Yturria Land & Livestock Co., Porcion 44, Sur. 883, TD 4,485 ft., perf. upper Sullivan 4,454-62



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WICHITA FALLS, TEXAS

Milam County: S. D. Johnson 1 Chester Schwope, Elizabeth Milburn Sur. A-414, dry, TD 4,299 ft.

Starr County: Hickok & Reynolds, Inc., & Geo. H. Coates 2 Manuels, Salinas de Guerra, Sur. 299, 18 mi. N. of Roma, dry, TD 5,201 ft.

Wilson County: Mark Leveridge, Bilbo, Redding 1 Walter Carr et al, A. Green Sur. dry, TD 3,015 ft.

Zapata County: Pontiac Refining Corp. 1 Slator Ranch, Jose Vasque Borrego Grant, Sur. 97, dry, TD 7,802 ft.

North Central Texas

Montague Well Becomes Prospective Discovery

WICHITA FALLS.—W. H. Bryant 1 Fred Rowe, southwest of Stoneburg in western Montague County, had its status changed from a dry hole to a prospective discovery with the addition of 50 ft. of hole.

Field reports a couple of weeks ago indicated the well was to be abandoned after a drill-stem test developed some free oil, with considerable water, at 6,120-47 ft. At last report the well had been drilled to 6,184 ft. and a drill-stem test of the last 4 ft. of conglomerate developed flowing oil in 31 minutes, with no water. Pipe was being run for completion.

In Haskell County, Mid-Continent Petroleum Corp. 1 Taylor flowed 241 bbl. of oil a day through 12/64-in. choke, from pay at 5,280-90 ft. Location of the new discovery is 3 miles northwest of the town of Haskell.

Three other Montague wildcats were showing oil on tests. A. R. Dillard 2 M. Fowler, north of Stoneburg in the Davis Survey, recovered 1,350 ft. of free oil and some mud on a 1-hour and 40-minute test at 6,138-41 ft.

West of St. Jo, Standard Oil Co. of Texas 1 L. L. Mosley had oil at the top in 42 minutes on a test from 6,605-22 ft. Operators were pulling pipe at last report.

George S. Engle 1 McCall, southeast of Nocona, developed 4,350 ft. of oil and 450 ft. of salt water on a 1-hour test at 5,915-40 ft. There was some oil-cut mud recovered, with an increase in salt water, from 6,032-49 ft. The last reported test, in granite wash from 6,471-78 ft., developed gas-cut salty mud.

Jack County had a new 6,300-ft. wildcat at L. T. Burns and others 1 J. M. Bloodworth, located 3 miles southwest of Shannon in the M. Anderson Survey, A-5. Location was also made for Burton, Ingraham & Price, Ltd. 1 S. H. Plaster, a 5,800-ft. wildcat 10 miles southwest of Jacksboro in the Nancy P. Overby Survey.

NORTH CENTRAL TEXAS (DISTRICTS 9 9 AND 7-B) SUCCESSFUL WILDCATS

Brown County: M. E. Singleton 1 Brewer, Sec. 29, HT&B Sur., TD 1,192 ft., pay 1,154 ft., IP pumped 43 bbl. 42°-gravity oil.

Coleman County: A. M. Howsley 1 C. H. Wilson, Sec. 42, BBB&C Sur., TD 3,554 ft., elev. 2,113 ft., perforated Jennings sand 3,468-79 ft., IP 181 bbl. 43°-gravity oil, 14/64-in. choke, TP 310 psi., GOR 330 cu. ft.

Eastland County: Harris O'Brien 1 J. C. Hodnett, J. Gaffey Sur., TD 1,269 ft., pay sand 1,262 ft., IP pumped 10 bbl. 44°-gravity oil.

Fisher County: RHK Drilling Co. 1 T. W. Willingham, 82-1-H&TC, TD 5,003 ft., elev. 1,976 ft., perforated 4,822-42 ft., IP 3,800,000 cu. ft. gas plus 95 bbl. 60°-gravity distillate, flowing pressure 1,130 psi.

Montague County: Geo. S. Engle 1 Fenoglio, Flint & Hendon, J. M. Collier Sur., A-489, TD 6,857 ft., elev. 1,070 ft., Caddo 6,400 ft., perforated 6,465-67 ft., IP pumped 156 bbl. 40°-gravity oil.

Palo Pinto County: W. R. Hines 1 L. L. Bridges, R. Clark Sur., A-135, TD 1,382 ft., gas sand 1,368 ft., IP 3,500,000 cu. ft. of gas, CP 640 psi.

Throckmorton County: Kenneth Ellison 1 W. B. Ewalt, Sec. 2,347, TE&L Sur., TD 4,614 ft., elev. 1,192 ft., conglomerate pay 4,593 ft., IP 110 bbl. oil, 20/64-in. choke, TP 75 psi.

Wichita County: W. H. Hammon 1 Wm. Fisher, Blk 25, K&N Subd., Cherokee CSL, TD 4,471 ft., oil sand 4,461-71 ft., IP pumped 7.3 bbl. 41°-gravity oil.

Wilbarger County: Vernon Petroleum Corp. 1 J. W. Jackson, 80-14-H&TC, TD 3,108 ft., elev. 1,225 ft., perforated 1,444-66 ft., IP pumped 25 bbl. 37°-gravity oil.

Young County: Bolin Oil Co. 1 Kathleen Preston, Sec. 5, SPRR, TD 4,838 ft., Caddo 3,960 ft., pay 4,038 ft., IP 14 bbl. 40°-gravity oil, 3/16-in. choke, TP 200 psi.

Warren Oil Corp. 4 J. T. Hamilton, TE&L Sur. 1,661, A-948, TD 4,454 ft., Mississippian perforations 4,440-54 ft., IP 212 bbl. 41°-gravity oil, 11/64-in. choke, CP 600 psi., GOR 480 cu. ft.; Caddo perforations 3,628-40 ft., IP 103 bbl. 43°-gravity oil, 12/64-in. choke, TP 690 psi., GOR 594 cu. ft.

Woodson Oil Co. 1 Woodson-Elmore, Sec. 3,404, TE&L Sur., TD 5,057 ft., Mississippian pay 5,029 ft., IP pumped 76 bbl. 41°-gravity oil, GOR 560 cu. ft.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) WILDCAT FAILURES

Archer County: T. B. Cochran et al 1-N Virgil Seay, Blk. 69, Harris Subd., dry, TD 1,401 ft.

Frank Wood 1 J. Prescher, Blk. 3, Clark & Plumb, dry, TD 4,710 ft.

Callahan County: W. E. Butler 1 Price Campbell, 11-8-SPRR, dry, TD 3,162 ft.

D. D. Feltman 2 G. S. Pruet, Sec. 3,166, TE&L, dry, TD 1,375 ft.

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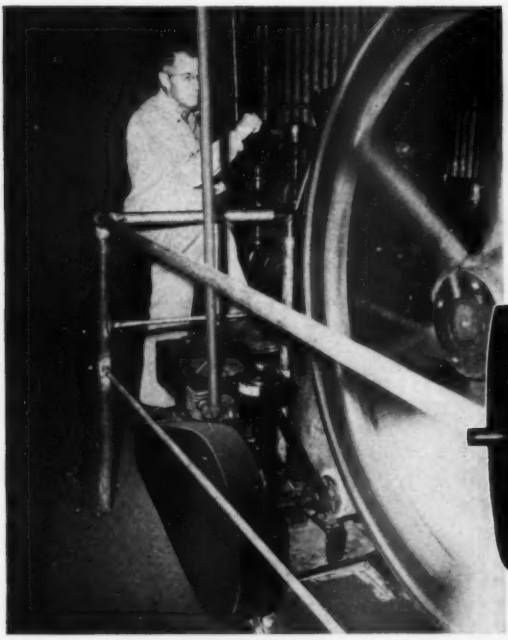

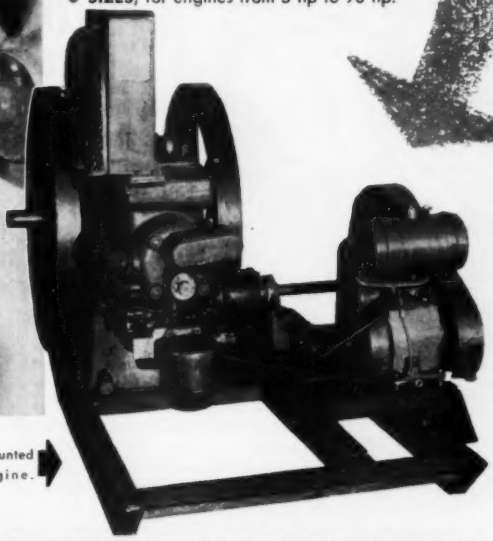

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Clay County: Bobby M. Burns 1-A Sansebacher, Maud Gross Sur., A-155, dry, TD 4,605 ft.

L. T. Burns 1 W. C. Gowan, Wm. Hill Sur., A-206, dry, TD 4,729 ft.

Coleman County: P. M. and W. P. Durbin 1 C. H. Wise, Jacob Smith Sur. 360, dry, TD 1,985 ft., elev. 1,406 ft., Barnett 1,835 ft., Ellenburger 1,930 ft.

Callihan Rotary Co. 1 T. E. Kenney, Sec. 89, C. T. Pendleton Sur. 274, dry, TD 1,835 ft., Fry 1,701 ft., Gardner 1,800 ft.

Wichita River Oil Co. 1-B McClatchey, Sec. 88, Bond & Sanders Sur., dry, TD 1,200 ft.

Cooke County: C. J. Bohner 6 Bell, F. J. Lindheimer Sur., dry, TD 2,876 ft.

Haskell County: Headwaters Oil Co. 1 S. W. Scott, J. H. Parkhurst Sur., dry, TD 5,718 ft.

Jones County: S. C. Herring 1 Clifford Hill, 49-2-SPRR, dry, TD 4,575 ft.

French M. Robertson 1 Reese Davis, 1-2-T&NO, dry, TD 2,003 ft.

Knox County: Seaboard Oil Co. 1 R. C. Hamilton, 15-13-H&TC, dry, TD 6,355 ft., elev. 1,507 ft., Ellenburger 6,296 ft.

Palo Pinto County: Chester Imes and West Central Drilling Co. 1 C. E. Allen, 48-4-T&P, dry, TD 2,620 ft.

Shackelford County: E. F. White 1 J. F. Downs, 59-14-Sam Lazarus Sur., dry, TD 2,100 ft.

Stephens County: Two Square D Oil Co. 1 G. E. Williams, 13-6-T&P, dry, TD 2,927 ft.

Stonewall County: B. A. Duffey 1 D. J. Herbst, 60-D-H&TC, dry, TD 6,415 ft., elev. 1,785 ft., Strawn 5,268 ft., Caddo 6,090 ft., Bend 6,162 ft., Mississippian 6,210 ft., Ellenburger 6,373 ft.

Throckmorton County: Cabot Carbon Co. 1 John T. Davis, Sec. 2, T&NO, dry, TD 5,006 ft.

Rock Hill Oil Co. 1 R. A. Brown, Sec. 929, TE&L Sur., dry, TD 4,143 ft., elev. 1,317 ft., Capps 2,978 ft., Caddo 4,124 ft.

Woodson Oil Co. 1-X R. A. Brown, Sec. 217, BBB&C, Sur., dry, TD 4,052 ft.

Wilmarger County: John and Pat O'Neil 1-L W. T. Waggoner, 103-14-H&TC, dry, TD 2,000 ft.

Young County: J. W. Hastings 1 Mary Sullivan, TE&L Sur., dry, TD 3,653 ft.

Sid Perryman et al 2 J. R. Barnett, Blk. 186, TE&L, dry, TD 1,030 ft.

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Southwest Worland Well Flows Oil From Phosphoria

DENVER.—The Gulf Oil Corp. wildcat at Southwest Worland, Washakie County, Wyoming, flowed 32 bbl. of oil in 5 hours, flowing by heads, with 900,000 cu. ft. of hydrogen sulfide gas daily on test in the Phosphoria. The well is 1 Stockham Federal, C SE NW 2-46n-94w, southwest of Worland pool where Pure Oil Co.'s wells flow oil from the Phosphia zone. The test was of the zone 12,896-12,972 ft. Gulf is coring ahead on the wildcat. This well also made gas and some oil on tests of the Frontier zone. The wildcat is located on a seismic prospect. Recently Husky Oil Co.-Wilshire Oil Co. made a Phosphoria gas and distillate discovery in the Five Mile area, north of Southwest Worland, with the well flowing an estimated 40 to 50 million cubic feet of gas daily and 50 bbls. of distillate per million cubic feet of gas. Husky-Wilshire are continuing tests on their wildcat. Both wells are of considerable importance for future reserves on deep basin drilling in the Big Horn basin area.

There are several near-discovery completions in the Denver-Julesburg basin. Vaughey & Vaughey of Jackson, Miss., tested oil from the "J" sand at 1 Goodwin, C SE SE 9-13n-54w, Kimball County, Nebraska. The "J" sand was found at 6,044 ft. and on test 6,046-92 ft. the well made 537 ft. of oil and 180 ft. of oil-cut mud, with 208 ft. of mud slightly cut with oil in 1 hour. Cores showed the "J" sand to be hard and tight but with good odor. The operator was coring ahead in another bench of the sand prior to completing the well. Another near completion in Nebraska is Ohio Oil Co. 1 M. Cook, SW SW SW 24-15n-48w, which tested oil from the "D" sand. The well was drilled to 4,575 ft. total depth, with casing cemented at 4,491 ft. on top of the "J" sand (third Dakota). The well made 2,060 ft. of oil with 100 ft. of oil and gas-cut mud on 1 hour test of the "D" sand (first Dakota) between 4,347-57 ft.

In Colorado, Roden, Darden & McRae 1 Middlemist, NE NE SW 20-2s-57w, is at 5,609 ft. total depth, with the operator running casing for completion. This well, the southernmost in the current basin play to find oil, made oil on tests of the "J" sand between 5,521-55 ft. In Weld County, Tuley & Carter are now testing their wildcat at 1 Raymond Johnson, NE SE NW 29-9n-56w, which made gas and distillate on tests of the "J" sand. S. D. Johnson, of Wichita Falls, Tex., has cemented casing and is preparing to test 1 Cnockaert, NE NE NW 6-5n-56w, a new discovery in Morgan County. This well made oil on tests of the "J" sand between 5,861-67 ft.

A wildcat of importance in the Williston basin is the Shell Oil Co. 1 Winter, C NW SW 11-22n-19e, the second of the company's series in northern South Dakota. This well was drilled to granite and plugged back and casing cemented for further tests in the Madison. The zone 5,578-5,610 ft. made a small amount of mud with pin points of live oil and cores of the Madison showed staining in fractures. Madison was topped at 5,583 ft. and casing has been cemented at 5,756 ft. The operator is perforating 5,585-

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5,615 ft. for thorough tests of the zone. Regardless of the outcome of the present well, Shell will reportedly continue its series of wildcat wells in this portion of the basin.

COLORADO WILDCAT FAILURES

Lincoln County, Mustang Creek: H. W. Hoots 2 Carl White, NE SE SW 19-13s-56w, dry, TD 4,144 ft. Fuson 4,034 ft., Lakota 4,096 ft., Morrison 4,125 ft.

Logan County, Northeast Sterling: H. E. Zoller 1 Goddard, C NE NW 21-9n-48w, dry, TD 4,252 ft. "D" sand 4,048 ft., "J" sand 4,154 ft., Fuson 4,224 ft.

WYOMING WILDCAT FAILURES

Big Horn County, Lovell dome: Ajax Oil Co. 1 Burnham, SW SE NW 7-56n-95w, dry, TD 2,293 ft. Dinwoody 2,090 ft., Phosphoria 2,127 ft., Tensleep 2,246 ft.

Johnson County: Carter Oil Co. 1 Government, NW NW SW 28-46n-82w, dry, TD 5,800 ft. Dakota 3,318 ft., Lakota 3,420 ft., Morrison 3,430 ft., Phosphoria 4,848 ft., Amsden 5,240 ft., Madison 5,718 ft.

Natrona County, Clark dome: R. M. Burke 1 Government, SW SE NW 22-31n-81w, dry, TD 3,727 ft. Embar 3,277 ft., Tensleep 3,605 ft., Tensleep sand 3,650 ft.

Sheridan County, Arvada: Helmerich & Payne 1 Weaver-Brennan, E½ NE NE 35-55n-78w, dry, TD 9,672 ft. Dakota 9,330 ft., Lakota 9,529 ft., Morrison 9,542 ft.

Sweetwater County, Spring Branch: The California Co. 1 Unit, NW SE NW 26-13n-111w, dry, TD 7,576 ft. Green River 648 ft., Wasatch 3,340 ft., Fort Union 6,340 ft.

Uinta County, Grizzly Butte: Mountain Fuel Supply Co. 1 Unit, NE SE SW 35-15n-113w, dry, TD 13,370 ft.

WESTERN NEBRASKA WILDCAT FAILURES

Banner County, Harrisburg area: Stanolind Oil & Gas Co. 1 F. L. Barrett, SE SE SE 23-18n-56w, dry, TD 6,752 ft. Upper Muddy 6,326 ft., Muddy 6,462 ft., Skull Creek 6,528 ft., Dakota 6,648 ft.

Keith County, Northwest Bruel: Argo Oil Co. and True & Brown 1 Kahl, NW NW SE 6-13n-40w, dry, TD 3,392 ft. Niobrara 2,378 ft., Ft. Hays 2,678 ft., Greenhorn 2,870 ft., "D" sand 3,031 ft., "J" sand 3,174 ft., "M" sand 3,387 ft.

Appalachian-Ohio

New Wildcat Drilling In West Virginia Area

PITTSBURGH.—In Holly district, Webster County, West Virginia, United Fuel Gas Co. 2-6969 Henry A. Brockerhoff new wildcat, elevation 2,295 ft., Sutton quadrangle, 4.55 miles south of lat. 38°, 40', and .55 mile west of long. 80° 30', is drilling at 1,266 ft. It is approximately 2,500 ft., northeast of 1-6761 completed in December 1951, gaging 1,800,000 cu. ft. gas in the Maxon sand. In Portland district, Preston County, T. W. Lafferty has located 1-L-638 Dorcey C. Grimm, elevation 2,608 ft., Kingwood quadrangle, 1.5 miles south of lat. 39° 30' and 2.85 miles west of long. 70° 30'.

Maryland.—Garrett County: Cumberland & Alleghany Gas Co., completed 1 Harry Rice gaging 350,000 cu. ft. gas, chert 3,017 ft., Oriskany sand 3,072 ft., TD 3,181 ft. Maryland Gas Co., Stanley Smith, elevation 2,502 ft., recorded the chert at 4,102 ft. and is drilling at 4,109 ft. Mid Atlantic Oil & Gas Co. 1 B. & O. R. R. Co. elevation 2,400 ft., is shut down at 3,633 ft. to run casing. Oil Ventures 1 George Beckman, elevation 2,638 ft., reached the Onondago at 5,792 ft., chert at 5,837 ft. and is drilling at this depth. Fox & Trimble 2 McGee is shut down at 4,038 ft., to re-shoot.

Pennsylvania.—Unity Township, Westmoreland County: Peoples Natural Gas Co.

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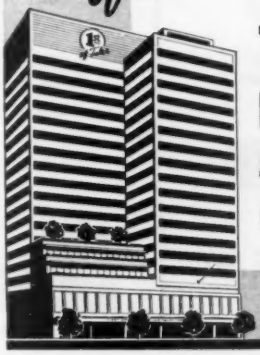

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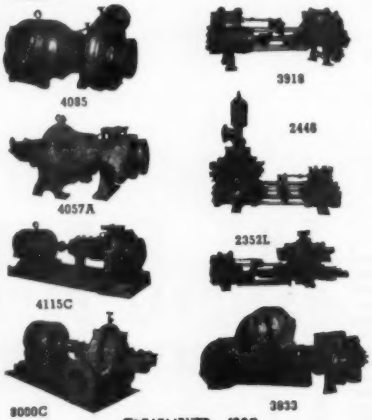

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4003 A. J. Dotterway, elevation 2,904 ft., is drilling at 7,137 ft.

MARYLAND SUCCESSFUL WILDCAT

Garrett County: Cumberland & Allegheny Gas Co. 1 Harry Rice 350,000 cu. ft. gas, chert 3,017 ft. Oriskany sand 3,072 ft., TD 3,182 ft.

OHIO

The Mid East Oil 4 Howard Neldon, third quarter, New Castle Township, Coshocton County, a south offset in the southeast corner of the pool, showed for 8 bbl. natural. The producer was shot with 150 qt. and made 65 bbl. during the first 24 hours.

Harmon et al. drilled in a fair gasser on R. O. Steltzer, Section 20, Chester Township, Wayne County, near the old field. Clinton 3,103-3,108 ft. and 3,160-3,172 ft. gaged 550,000 cu. ft. and the well will be tubed natural.

Among the scattered tests starting in the new Putnam field are the Eberly and Snee 1 C. D. Robinson, Section25, Belpre Township, and Eberly and Snee 1 Paul Allen, Section 15, Barlow Township, Washington County.

Newman et al. are drilling a wildcat test on the Newman Estate in Lot 8, Bath Township, Summit County.

Permian Basin

Culberson County Has Prospective Discovery

MIDLAND.—East-central Culberson County had a prospective discovery at M. A. Grisham 1 Grisham fee, 10-60-T5S-T&P, located some 30 miles northwest of Toyah. On a 1-hour drill-stem test of an unidentified formation from 9,032-55 ft., gas came to the surface in 2 minutes, estimated at 40,000,000 cu. ft. daily. Bottomhole flowing pressure was 1,125 psi., which increased to 3,050 psi. when shut in 22 minutes. There was no recovery in the drill pipe. A previous test at 8,086-8,172 ft. developed gas-cut salt water. Projected depth was 9,200 ft.

Magnolia Petroleum Co. 1-A Homer Cowden in 12-63-T2N-T&P, 29 miles southwest of Murray, Culberson County, was drilling below 5,616 ft. on a 10,500-ft. contract.

McAlester Fuel Oil Co. 1-A Allen, southwest Scurry County prospect, found a second possible pay section, probably Strawn, and was drilling ahead to the Ellenburger after making drill-stem tests.

First free oil was developed on a test from 7,308-34 ft. A 2-hour test at 7,364-89 ft., probably in the lower Canyon reef, developed 288 ft. of oil and gas-cut mud, plus considerable salt water. A second limestone top, thought to be Shrawn, was reported at 7,447 ft., on elevation of 2,279 ft. From cores, it was estimated the well had a possible 32 ft. of pay down to 7,479 ft. A drill-stem test between 7,447-62 ft. had gas in 3 minutes and oil in 20 minutes, which flowed to pits at an estimated rate of 10-15 bbl. an hour. On a 1½-hour test from 7,466-83 ft. gas surfaced in 5 minutes but no fluid reached the top while the tool was open. Some fluid unloaded on the way out and final recovery was 90 ft. of oil and 545 of salt water.

In the Jameson area of Coke County, Sun Oil Co. 21 Jameson extended Strawn sand production 1½ miles northeast, into the Strawn limestone area, in 316-1A-H&TC. Completion was for 104 bbl. of oil a day through 5/32-in. choke, from open hole at 6,010-12 ft., total depth. The 21 Jameson was reported as the third sand producer since discovery of the new pay was made on the field's west side.

Anderson-Prichard Oil Corp. staked location for its 1-24 David Fasken and Inez Fasken in Section 24, on the northwest side of the Midland Farms field of Andrews County. The operation will seek Ellenburger production in the shallow Grayburg and San Andres field, and has been projected to 14,000 ft.

In northeast Andrews County, Magnolia 1 University conditioned mud before drilling plugs at 12,981 ft. It was to drill ahead.

Anderson-Prichard and Greenbrier Oil Co. 1 Windham, Upton County wildcat, swabbed and flowed 215 bbl. of oil, water and sediment from perforations at 9,709-60 ft., in the Wolfcamp.

Gulf Oil Corp. 1 McElroy, west offset to the 1 Windham, drilled to 11,300 ft. It had the Devonian low to the 1 Windham and was to plug back to 9,840 ft. and test in the Wolfcamp.

WEST TEXAS (DISTRICTS 8 AND 7-C) SUCCESSFUL WILDCATS

Andrews County: Gulf Oil Corp. 1-NN University, 21-9-University, TD 12,628 ft., elev. 3,195 ft., Ellenburger 12,498 ft., pay 12,519 ft., IP 1,015 bbl. 49°-gravity oil, ¼-in. choke, TP 1,190 psi., GOR 43 cu. ft.

Pecos County: Fuhrman Petroleum Corp. 1 Humble-Shearer, 43-10-H&GN, TD 1,916 ft., elev. 2,425 ft., pay sand 1,852 ft., IP 15 bbl. 37°-gravity oil, ⅛-in. choke, TP 150 psi., GOR 875 cu. ft.

WEST TEXAS (DISTRICTS 8 AND 7-C) WILDCAT FAILURES

Borden County: Hunt Oil Co. 2 R. L. Gray, 228-97-H&TC, dry, TD 8,474 ft.

Coke County: E. L. Doheny 1 M. Taylor, Sec. 631, C. Keiser Sur., dry, TD 5,566 ft., elev. 1,887 ft., Ellenburger 5,450 ft.

Concho County: Seaboard Oil Co. 1 J. C. Landon, 81-71-H&GN, dry, TD 3,158 ft., elev. 1,731 ft., Strawn 2,745 ft., Ellenburger 3,014 ft.

Crockett County: J. S. Abercrombie 1 J. H. Felps, 15-31-H&TC, dry, TD 6,144 ft., elev. 2,291 ft., Simpson 4,814 ft., Ellenburger 5,740 ft.

Curtis R. Inman 1 Shannon Est., Tract 5, Lge. 4, Archer CSL, dry, TD 2,152 ft.

Glasscock County: Lion Oil Co. 1 Cope, 19-34-T5S-T&P, dry, TD 7,009 ft., elev. 2,686 ft., Spraberry 6,120 ft.

Lamb County: Anderson Prichard Oil Corp. 1 E. M. Gettys, Sec. 59, W. E. Halsell Subd., dry, TD 9,315 ft., elev. 3,719 ft., Mississippian 8,825 ft., Ellenburger 9,220 ft., pre-Cambrian 9,285 ft.

Loving County: Davis, McDaniel & Beecherl 1-H TXL, 31-35-T1S-T&P, dry, TD 3,712 ft., elev. 2,945 ft., Delaware lime 3,629 ft., sand 3,655 ft.

Midland County: The Texas Co. 1 H. W. Montgomery, 44-39-T2S-T&P, dry, TD 11,030 ft., elev. 2,787 ft., Spraberry 7,740 ft., Pennsylvanian 10,460 ft.

Mitchell County: Hunt Oil Co. 1 W. L. Elwood, Sec. 33, J. P. Smith Sur., dry, TD 7,412 ft., elev. 1,966 ft., Strawn 7,127 ft., Mississippian 7,188 ft., Ellenburger 7,250 ft.

Runnels County: Creslenn Oil Co. 2 E. O. Lange, W. J. Smith Sur. 60½, dry, 3,844 ft.

Kilroy Oil Co. 1 A. G. Bailey, Sec. 83, 4 mi. NW Winters, dry, TD 3,920 ft.

G. W. Strake, 2-B J. D. Smith, W. A. Kelly Sur. 43½, dry, TD 5,056 ft., elev. 1,994 ft., Fry 4,373 ft., Goen 4,535 ft., Caddo 5,036 ft.

Scurry County: C. T. McLaughlin 1 Monroe, 216-97-H&TC, dry, TD 7,500 ft., elev. 2,459 ft., Wolfcamp 4,712 ft., Strawn 7,418 ft.

Sterling County: J. S. Abercrombie 1 W. L. Foster, 4-11-SPRR, dry, TD 1,702 ft., elev. 2,216 ft., Clear Fork 1,548 ft.

Sutton County: Pure Oil Co. 2 S. H. Allison, 29-B-HE&WT, dry, TD 7,924 ft., elev. 2,337 ft., Strawn 5,354 ft.

Tom Green County: Murray Petroleum Co. et al 3 J. Wiley Green, Sec. 184, SPRR, dry, TD 4,799 ft., elev. 2,066 ft., Strawn 4,760 ft.

Progress Petroleum Co. of Texas - H. Timm, Sec. 111, SPRR Sur., dry, TD 5,420 ft., elev. 1,837 ft., Ellenburger 5,250 ft.

Taylor Refining Co. 2 George Foster Rust, Sec. 8, Blk. A, A. E. Lock Sur., dry, TD 5,023 ft., elev. 2,336 ft., Permo-Pennsylvanian 4,250 ft., Strawn 4,970 ft.

Upton County: Republic Natural Gas Co. and Seaboard Oil Co. 2 UTL, 18-15-University, dry, TD 11,260 ft., elev. 2,432 ft., Strawn 8,560 ft., Devonian 9,470 ft.

TEXAS PANHANDLE

In the Texas Panhandle, Ray A. Albaugh was reported to have contracted for three wildcats on the Matador Land & Cattle Co.'s Alamocitas Ranch in Oldham County. Farmout for the deal was from Superior Oil Co. Locations for the proposed tests had not been disclosed, but projected depth was around 6,500 ft.

In Gray County, 7 miles northeast of Pampa, Phillips Petroleum Co. 1 Hobart Ranch, 26-3-I&GN, completed as a gas-distillate discovery. Pay section, perforated at 8,355-60 ft., was not immediately identified. Production was 3,250,000 cu. ft. of gas

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a day, plus 10.7 bbl. of oil. Total depth was 10,001 ft., plugged back to 8,726 ft.

TEXAS PANHANDLE (DISTRICT 10) WILDCAT FAILURE

Armstrong County: H. L. Hunt 7 Ritchie, 131-G6-A&B, dry, TD 7,258 ft.

SOUTHEASTERN NEW MEXICO

A three-mile Devonian extension, or new discovery, was assured at The Texas Co. 1 Moore, north of the East Cap Rock-Devonian field, in 25-11s-32e. A drill-stem test from 10,395-425 ft., open 2½ hours, gaged 121.4 bbl. of oil. Recovery in the pipe was 77 bbl. of 45°-gravity oil, with no water. Operators were to core ahead.

Derrick was being built for Tide Water Associated Oil Co. 1 H. T. Monteith, Devonian wildcat 2½ miles northwest of the same company's 1-PD State, recent Pennsylvanian discovery on the east side of the Loving field. Sohio Petroleum Co., G. H. Coates and Montoya Oil Co. were said to be supporting the test.

Wilshire Oil Co. 1 Townsend, dry in the Devonian at 13,803 ft., was to plug off the lower formation and start testing up the hole. Top of the Devonian was 13,368 ft., on elevation of 4,029 ft. The well previously showed for production from the Strawn lime between 11,470-520 ft. and from the Wolfcamp at 10,410-500 ft.

North of the Saunders field, The Texas Co. 1-BG State, southeast offset to its 1-AT State, developed 620 ft. of oil and gas-cut sulfur water on a test of the Wolfcamp at 9,865-85 ft. It was drilled ahead, and at 9,910-36 ft. a drill-stem test had gas in 4 minutes, with no fluid at the surface. After pulling 45 stands of pipe, the well started unloading clean oil. There was no water with the oil, and at last report operators had pulled 5,866 ft. of pipe.

SOUTHEAST NEW MEXICO SUCCESSFUL WILDCATS

Lea County: Amerada Petroleum Co. 1 Mary Raley, 17-20s-38e, TD 9,240 ft., elev. 3,573 ft., McKee 9,104 ft., IP 504 bbl. 45°-gravity oil, ¼-in. choke, TP 775 psi., GOR 339 cu. ft.

Roosevelt County: Austral Oil & Exploration Co. 1 M. H. McGrail, 18-8s-38e, TD 4,802 ft., elev. 4,005 ft., San Andres 3,890 ft., pay 4,610 ft., IP 104 bbl. 26°-gravity oil, open tubing, CP 150 psi., GOR 350 cu. ft.

SOUTHEAST NEW MEXICO WILDCAT FAILURES

Eddy County: Malco Refineries, Inc. 1 W. M. Boyd, 14-19s-25e, dry, TD 4,799 ft., elev. 3,441 ft., Glorietta 2,837 ft., Bon Springs 3,915 ft.

Lea County: The Texas Co. 1-AY State, 35-10s-37e, dry, TD 12,145 ft., Wolfcamp 9,130 ft., Mississippian 11,610 ft., Devonian 12,113 ft., tentative tops.

Canadian Fields

New Gas Strikes Reported In Western Canada

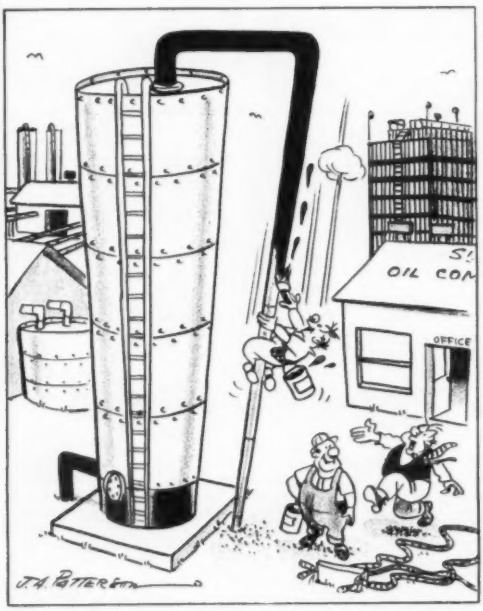
CALGARY.—Natural gas reserves in western Canada received another increase during the past week, as five wildcat and extension wells reported natural gas strikes. The largest and most important gas find was made in the northeast sector of British Colombia, while the other four strikes were in Alberta.

The British Columbia discovery was made at the Pacific Group 4 Fort St. John wildcat, about 50 miles northwest of Dawson Creek, along the Alaska Highway and in the vicinity of the Westcoast Transmission Co.'s proposed gas export pipe-line route. The Fort St. John discovery well this week found natural gas plus naphtha or light crude oil in the middle Triassic formation. It is located about 2¾ miles northwest of the Pacific Group's wildcat which last November discovered oil in the Permo-Pennsylvanian. That well carried out some tests late last year, but has not completed its production tests and it cannot as yet be determined whether it is a commercial oil discovery.

The 4 Fort St. John well, rated as a "wet gas" discovery, flowed natural gas from the Triassic at maximum rate of 9,000,000 cu. ft. daily. Accompanying that gas flow, believed to be among the largest at any wells so far drilled in British Columbia, was a spray of naphtha. When pipe was pulled from that test it was found to contain 5 gal. of naphtha, no water. A further 10-ft. core has been taken since that test, to 4,815 ft., and testing was under way at latest report. Hole will be carried down to test the remaining Triassic section preliminary to heading down for the Permo-Penn objective.

In the Lac la Biche area, 115 miles northeast of Edmonton, Canadian Delhi rated what appears to be either an extension or discovery of a new gas reserve. Delhi's find was made at 4 Lac la Biche, a step-out venture some 8 miles east of a Central Leduc well that discovered gas and blew wild some time ago. The find was made in the McMurray sands, below the well's original Viking sand objective that failed to yield. The McMurray gave up gas at rates over 1,700,000 cu. ft. daily during drill-stem tests, and no water was encountered. Production string of casing has been set.

A moderate flow of natural gas was obtained this week at a wildcat being drilled by Socony-Vacuum in the Carbon area of southern Alberta. This venture, 45 miles northeast of Calgary, discovered its gas in the Madison limestone, around 5,200 ft., and flowed at rate of just under one million cubic feet daily during initial drill-stem test in that formation. Hole is being deepened.



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The usual flush design with no shoulders for stopping a slipping drill collar.

The drill collar's hard heat-treated surface that reduces gripping efficiency.

The relatively low drill string weight available for wedging the slips into the bowl.

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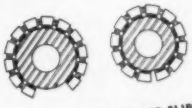
That's why safety-minded operators throughout the world have adopted Baash-Ross Drill Collar Slips as "must have" rig equipment, because these Slips are *specially designed* to overcome the risks of supporting a drill string in the rotary table. In contrast to the normal fixed-curvature design of rotary slips, the unique multi-segment design of Baash-Ross Drill Collar Slips permits them to w-r-a-p around the drill collar like a chain tong. They take a full slip-proof grip whether the drill collar is new or worn, round or out-of-round. *And they automatically compensate for as much as 1½" change in drill collar diameter—more than ample for modern drilling operations.*

For example, note in the table how a Baash-Ross Drill Collar Slip that fits a 7" diameter drill collar will also fit *any* diameter down to 5½". Adjustment for wear is automatic and continuous throughout the working range!

This means that Baash-Ross Drill Collar Slips automatically take a *full* grip on any drill collar within their range—a grip that gives adequate support to compensate for the continuous wear which changes drill collar diameters . . . for the hard heat-treated surface . . . and for the lack of drill string weight.

The "Why" of Baash-Ross Drill Collar Slips

ORDINARY SLIPS that fit the drill collar when new (A) are unable to adjust themselves to smaller diameters as the drill collar wears away. Result, grip becomes less and less adequate (B) and risk of a costly fishing job constantly greater.



BAASH-ROSS DRILL COLLAR SLIPS consist of many narrow slip segments flexibly linked together. Result—they w-r-a-p around the drill collar and always take the same full grip whether drill collar is new or worn, round or out-of-round.

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Sizes and Operating Ranges of Baash-Ross Drill Collar Slips		
SIZE	Operating Range From	To
A	3"	4½"
B	3¾"	5¼"
C	4¼"	5¾"
D	5½"	7"
E	6¾"	8¼"

FOR DOUBLE SAFETY

When *double* protection is desired, note that Baash-Ross Drill Collar Slips have extensions above the gripping area to provide seat for a Baash-Ross Safety Clamp—the clamp that puts a non-slip, *yet removable*, "stop shoulder" on *any* drill collar to compensate for the hazards of flush design when supporting the collar in the table. For complete details see your nearest Baash-Ross representative—or write direct!

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Near Okotoks, some 16 miles south-southeast of Calgary, Shell Oil Co. 1 Herr extension venture obtained a gas flow rate in excess of 3,000,000 cu. ft. daily during a series of drill-stem tests in the Devonian formation. Largest volume of gas came in at around the 8,500-ft. level, and crew was continuing to deepen the hole.

In the Bonanza area of northwest Alberta, natural gas was found at another extension test. This well, about 4 miles east of the British Columbia border and 100 miles west-southwest of Peace River town, flowed gas at rate of 1,850,000 cu. ft. daily. Coring and testing is being continued below 2,235 ft.

CANADIAN SUCCESSFUL WILDCATS

Hudson's Bay 1 Dunvegan, LSD 6 4-81-6w6, TD 3,848 ft. Capped potential gas well.

Hudson's Bay-Union 1 Heart River, LSD 4 17-77-16w5, TD 7,611 ft. Capped potential gas well.

CANADIAN WILDCAT FAILURES

Fargo-Scurry et al. 1 Aden, LSD 3 5-1-9w4, TD 3,403 ft.

Canadian Superior 13-30 Miller, LSD 13 30-40-12w4, TD 3,196 ft.

Sun 1 Faust, LSD 11 8-71-12w5, TD 6,588 ft.

Phillips 1 Naylor, LSD 4 24-98-25w5, TD 4,573 ft.

Leduc Calmar 2 Oliver Lake, LSD 6 23-50-21-w4, TD 3,900 ft.

Oklahoma

Beckham Wildcat Tests Deep High-Pressure Zone

TESTING is under way at Phillips Petroleum Co. and associates' deep wildcat, 1 J. M. Flynn, C SE SE 27-11n-23w, 6 miles north of Sayre, northern Beckham County, in western Oklahoma. The well has approximately 200 ft. of net, porous potential oil or gas pay in the Pennsylvanian-Deese, granite-wash section between 14,200 ft. and the bottom of the hole at 15,077 ft. Liner, run through the section to the bottom of the hole, has been perforated opposite the prospective pay zone. A protection string of casing (7-in.) previously had been cemented at 13,537 ft.

At the well's total depth, the prospective productive zone had not been penetrated completely, but because of high gas pressure encountered, particularly below 15,000 ft., operators elected to attempt completion of the well at the present depth rather than to drill ahead and determine the full extent of the zone. Because of the hazards presented by the high pressure no drill-stem tests were attempted.

The well, located 6½ miles northwest of the deep (10,000-ft.) Elk City field, was drilled to 11,535 ft. by Howell & Howell and Walter Duncan with Parker Drilling Co. of Tulsa as the contractor. At that depth, Phillips Petroleum Co., designated as operator of the newly formed unit on which the well is located, assumed the actual operation and carried the hole to its present depth with the same contractor.

Helmerich & Payne, Inc., has resumed testing operations at its Hoxbar granite-wash discovery well, 1 Britton, C NE NE 28-9n-17w, south of Cordell, Washita County, also in western Oklahoma. Following installation of special equipment to produce the oil, which congeals at temperatures lower than 40° F., the well flowed 15 bbl. of oil in 5 hours. Gas flow at the start of the test was at the rate of 5,180,000 cu. ft. per day but declined to 2,590,000 cu. ft. per day at the end of the 5-hour period. Operators now are preparing to perforate casing opposite additional indicated pay zone. Present production is from perforations at 7,962-92 ft.

Testing also is getting under way at another indicated discovery well. It is Arthur Finston 2 Dumas, NW NW NE 6-16n-3e, 3 miles west of the Northwest Tryon pool, in Lincoln County, in the central part of the state. The well is virtually assured of production in either the Hunton lime or Red Fork sand, and also had oil showings in both the first and second Wilcox sands. It now has 5½-in. casing run to the top of the second Wilcox sand at 4,844 ft. with bottom of the hole at 4,854 ft. A drill-stem in Red Fork sand at 4,270-81 ft. filled 2,500 ft. of clean oil in 60 minutes. A 90-minute test at 4,530-4,601 ft. in Hunton lime got gas in 11 minutes and made 610 ft. of free oil and 120 ft. of heavily oil and gas-cut mud.

Two other key wildcats in the testing stage are Stanolind Oil & Gas Co. 1 Barakat, SE SE NE 7-6s-8e, northwest of Silo, in Bryan County, southern Oklahoma, and Continental Oil Co. 1 Kimball, NW NW SW 34-20n-16w, 4 miles southeast of Chester, southwestern Major County, in the western part of the state. The former, located 5 miles southeast of the Cumberland field, nearest production, failed on its first test, a drill-stem test of casing perforations in Bromide sand at 7,554-80 ft., which got 600 ft. of water blanket and 4,700 ft. of mud in 23 hours. Perforations have been squeezed and casing will be reperforated at a different interval. Although no previous drill-stem tests had been made, cores through the second Bromide sand, topped at 7,453 ft., carried good porosity and oil staining at various intervals. Hole was carried to 9,010 ft. in the lower Simpson section and then plugged back to 7,609 ft. with casing run to 7,655 ft.

Continental's Major County wildcat has casing perforated at 8,364-8,474 ft. for first tests in Chester lime. A previous drill-stem test in this zone at 8,382-8,428 ft. got a substantial gas flow (estimated 5,000,000 cu. ft. per day after 16 minutes) and filled 1,710 ft. of 56.5°-gravity distillate and 270 ft. of gas and distillate-cut mud in 74 minutes. Since then it has been drilled to 11,861 ft. in the Arbuckle dolomite, and with no important showings in the deeper zones, has been plugged back to 8,536 ft. Bottom of the casing is at 8,572 ft.

OKLAHOMA SUCCESSFUL WILDCATS

Okmulgee County: George & Wrather Oil Co. 1 Sowers, EW NE NE 4-12n-12e, pumped 20 bbl. 38°-gravity oil from Cromwell 2,515-27 ft., TD 3,199 ft. (extends Tiger Flats pool).

Osage County: Frank Buttram 3 Osage, NE SW SW 17-22n-8e, flowed 204 bbl. 38°-gravity oil from Skinner 2,427-41 ft., TD 2,441 ft. (new pay).

Pottawatomie County: Sunray Oil Corp. 1 Johnson, NE NW NW 28-8n-2e, pumped 126 bbl. 19°-gravity oil from Bois d'arc 5,274-5,380 ft., TD 6,163 ft.

Stephens County: Mack Oil Co. 1 Sledge, NE NW NE 23-2n-5w, flowed 300 bbl. 44°-gravity oil from Hoxbar 4,000-16 ft., TD 5,515 ft.

OKLAHOMA WILDCAT FAILURES

Comanche County: Gulf Coast Western Oil 1 Moss, SE SE NE 12-1n-10w, dry, TD 2,507 ft.

Joetta Oil 1 Black, SW SW SW SE 8-2n-10w, dry, TD 386 ft.

Cotton County: S. F. Hutcheson 1 Champion, S/2 S/2 SE SE 30-1s-11w, dry, TD 2,344 ft.

Walker Petroleum Co. 1 Scheler, SE NW SE 10-3s-13w, dry, TD 2,332 ft.

Lincoln County: Sun Oil Co. 1 Loessin, NE NE NW 33-12n-3e, dry, TD 5,650 ft.

Oklahoma Co. 1 Smith-Way, NE SE NE 19-12n-6e, dry, TD 4,655 ft.

Logan County: Leslie A. Johnston 1 Birchet, NW NW SE 22-19n-2w, dry, TD 5,565 ft.

McIntosh County: Albert C. Johnson 1 Morler, SW NW SW 33-12n-15e, dry, TD 2,338 ft.

Noble County: Vickers Petroleum Co., Inc. 1 Marshall, NE NE NE 9-21n-2w, dry, TD 5,272 ft.

Oklahoma County: Harper-Turner 1 Erickson, C NW NW 24-14n-3w, dry, TD 6,089 ft.

Payne County: Beach & Talbot and Sunray 1 Linsenmeyer, SW SW SW 29-19n-3e, dry, TD 4,530 ft.

Roger Mills County: Gulf Oil Corp. and Sinclair Oil & Gas Co. 1 Vera Sprawls, C NW NW 28-13n-23w, dry, TD 14,511 ft.

California

New Pay Horizon Added to Buena Vista Hills Field

LOS ANGELES.—Stevens zone oil production has been added to the productive horizons of the old Buena Vista Hills field, southwestern San Joaquin Valley. Highly productive Stevens sand has been established in Elk Hills and other nearby fields but the new discovery of Standard Oil Co. of California was the first for the Buena Vista fields.

The discovery, located about 2½ miles northeast of Taft, was completed in the fractured Z zone at 3,533-4,398 ft. Initial flow of the discovery, 503 9-D, was at the daily rate of 168 bbl. and was accompanied by some 420 M.c.f. of gas. Flow of the 30.5°-gravity crude was through a 48/64-in. bean.

Although not a new zone discovery, a development at Kettleman North dome, Fresno County, may prove of importance and lead to a well deepening program. Kettleman North Dome Assn. deepened its 23-20J from 10,869 ft. to 11,319 ft. to take in more of the McAdams sand, which had been topped at 10,695 ft. when originally completed as a 275-bbl. producer in 1940. With 4¾-in. liner landed at 11,314 ft., based on a short flow the well was rated as a 900-bbl. producer. Flow, on a 24/64-in. bean, was through perforations at intervals between 11,149 and 11,314 ft.

Three new producers were added in Arvin field southeast of Bakersfield and a new wildcat was announced for the area. In 22-31s-29e, on the west flank of the field, Havenstrite Oil Co. 2 Richards was completed as a 100-bbl. producer. Flow was through perforations at 6,666-6,801 ft. and 6,866-6,911 ft. The latter was a new horizon in the Santa Margarita.

The Texas Co. completed a small producer in the George discovery area in Section 23, and a second one on its Kern Valley Farms lease in Section 15. Texaco also announced a new test ¾ mile north of the latter. It will be A-1 DiGiorgio in SE 10-31s-29e, in an area where several unsuccessful wildcats have been drilled.

Development was continuing in Camden field, Fresno County, where last year oil production was established in 10 ft. of Miocene sand at about 6,100 ft. Lebow-McNee Oil Co. jointly with E. C. Von Glahn completed 3 Coleman Community as a 1,000-ft. stepout to the discovery well. Located in NE NW 8-17s-20e, it flowed at the daily rate of 65 bbl. through a 10/64-in. choke, from perforations in the Coleman sand at 6,098-6,108 ft. The operators were preparing to start 4 Coleman as a southeast offset. In SW NE Sec. 6, B. B. Breckenridge staked location for an eastern offset to Santa Fe Drilling Co. 1-A Dyson, completed last September as a 1½-mile northwest extension.

Superior Oil Co. shortly is to start a deep test about 2½ miles southeast of South Cuyama production in Santa Barbara County. Site of the wildcat will be in Section 21-9n-26w, on a 2,600-acre block which was made up largely by farm-outs obtained from Bandini Petroleum Co., Honolulu Oil Co., Oceanic Oil Co., and Wilshire Oil Co. Superior, which holds additional acreage in the area, is expected to give the region a thorough test.

CALIFORNIA SUCCESSFUL WILDCATS

Kern County, new deeper zone in Arvin field: Havenstrite Oil Co. 2 Richards, SE NE 22-31s-29e, flowed 100 bbl. per day through perforations at 6,666-6,801 ft., 36.2°-gravity crude, 16/64-in. bean, Santa Margarita 6,665 ft., new zone 6,866-6,911 ft., TD 6,911 ft., elev. 466 ft.

Los Angeles County, ½-mile east extension to Castaic Hills field: Continental Oil Co. et al, 32-36 Harding, NE NW 36-5n-17w, flowed 141 bbl. per day from Sterling sand through perforations at

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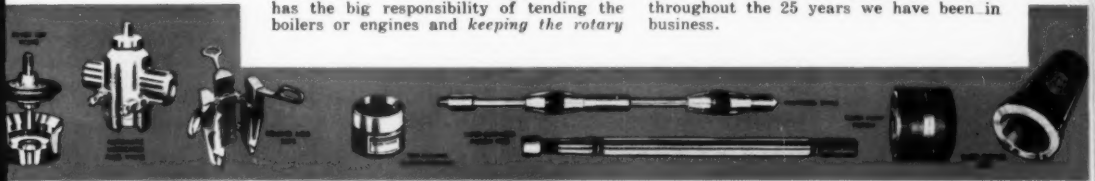

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5,337-5,427 ft., 33.6°-gravity crude, 18/64-in. bean, TD 5,438 ft., elev. 1,350 ft.

Ventura County, new McGrath pool discovery ¾ mile northeast of Montalvo field: Stanolind Oil Co. 1 Pidduck, 20-2n-22w, pumped 72 bbl. per day 26.5°-gravity crude, 3 per cent cut, from perforations at 9,860-9,913 ft., TD 10,265 ft., redrilled TD 9,913 ft., elev. 52 ft.

CALIFORNIA WILDCAT FAILURES

Fresno County, Coalinga area: Universal Cons. Oil Co. 27-31 Seaboard-SP, 31-18s-16e, dry, TD 9,606 ft., elev. 495 ft.

Kern County, Fruitvale area: Norbel Oil Co. 1A-14 KCL, 14-29s-27e, dry, TD 2,894 ft., elev. 435 ft.

Santiago area: Richfield Oil Corp. 45-14 Leutholtz B, 14-11n-23w, dry, TD 7,719 ft.

Los Angeles County, Castaic Hills area: Wood-Callahan Oil Co. 36-1 Castaic, 36-5n-17w, dry, TD 7,003 ft., elev. 1,080 ft.

Chatsworth area: Sunray Oil Corp. 81-16 Porter Est. 16-2n-16w, dry, TD 8,088 ft., elev. 1,127 ft.

Ventura County, Wheeler Canyon area: Union Oil Co. x-8 Ex-Mission, 25-4n-22w, dry, TD 4,551 ft., elev. 1,236 ft.

Kansas

Graham Wildcat Makes 305-Bbl. Oil Producer

MUSGROVE PETROLEUM CO. has definitely established a new producing area in southwestern Graham County at its 1 Dorman, NW NW NW 30-10-23. The well, placed on the pump for completion, produced 305 bbl. of oil in 24 hours as its initial potential. Water output was approximately 16 bbl. or only about 5 per cent of the total fluid. Production is from the Lansing-Kansas City lime section, topped at 3,759 ft. (—1,340 ft.), with casing perforated opposite a zone at 3,961-68 ft. Nearest other production is in the Wakeeney field, 6 miles to the southeast in northern Trego County.

Two additional new pools also have been opened in Barton County. Honaker Drilling Co. 1 Lamatsch, SW SW SW 26-16-12, discovery well of the Lott pool, in the northern part of the county, established a pumping potential of 50 bbl. of net oil daily at completion with pay zone in the Arbuckle lime at 3,359-70 ft. Top of the pay was logged at 3,354 ft. (—1,453 ft.). Alpine Oil & Royalty Co. 1-B Hammeke, SE SE SW 7-19-12, east of Great Bend, and a mile north of the North Fort Zarah pool, in the central part of the county, opened an unnamed pool with a pumping potential of 75 bbl. of oil per day from the Lansing-Kansas City lime, opposite which casing is perforated at 3,322-38 ft. Top of the Lansing is 3,184 ft. (—1,311 ft.).

In northwestern Sumner County, in the southern part of the state, The Texas Co. 1 Zeigler, SW SW NE 10-30-3, an indicated discovery well in the Lansing, was drilling ahead below 3,870 ft. in the Mississippian at latest report. Top of the Mississippian was logged at 3,796 ft. In the Lansing, topped at 3,188 ft., a 2-hour drill-stem test at 3,237-56 ft. got 100 ft. of oil and gas-cut mud. Another 2-hour test at 3,305-20 ft. got 230 ft. of oil and gas-cut water.

Amerada Petroleum Corp. has another prospective producer for the new pool opened early this year by Anderson-Prichard Oil Corp. in southwestern Osborne County. It is 2 Koelling, NE SE NE 22-10-15, southwest of the discovery well, 1-A Ruggles, NW NW NW 23-10-15. In the Conglomerate, pay zone of the discovery well, a 2-hour drill-stem test at 3,356-91 ft. got 715 ft. of oil with 870 ft. of muddy water and 350 ft. of salt water. Promising showings also were obtained in the Lansing, topped at 2,993 ft. This pool gave the county its first production.

KANSAS SUCCESSFUL WILDCATS

Ellis County: Jones, Shelburne & Farmer 1 Stecklein, SW NW NW 20-15s-17w, pumped 10 bbl. oil from Lansing-Kansas City 3,307-30 ft., TD 3,616 ft. (new pay in Wheatland pool).

Marion County: W. R. Atkinson-Barmore et al 1 H. Brown, CNL N½ SE 33-21s-4e, pumped 3 bbl. oil from Mississippi chert 2,269-75 ft., TD 2,503 ft.

KANSAS WILDCAT FAILURES

Barton County: J. Lindas 1 Cameron, SE SE SE 3-20s-15w, dry, TD 3,805 ft.

Decatur County: H. Gore 1 Feely, NW NW NE 26-5s-27w, dry, TD 4,210 ft.

Ellis County: Musgrove 1 McCombs, NW NW NW 11-11s-17w, dry, TD 3,480 ft.

E. F. Wakefield et al 1 Schumacher, SW SW SW 21-12s-18w, dry, TD 3,810 ft.

GMR 1 Reemsnyder, NW NW NW 4-13s-18w, dry, TD 3,867 ft.

Finney County: Shell Oil Co. 1 Baumann, NE NE NE 4-22s-29w, dry, TD 5,347 ft.

McPherson County: Victor Drilling Co. 1 Swenson, SE SE SE 21-18s-4w, dry, TD 3,790 ft.

Osborne County: Muskogee 1 Koelling, NW NE NE 26-10s-15w, dry, TD 3,553 ft.

Rush County: Northern Ordnance 1 Stremel, SW SW NW 19-16s-16w, dry, TD 3,365 ft.

Sedgwick County: Champlin 1 Peltzer, NE NE SE 15-26s-3w, dry, TD 4,120 ft.

Stafford County: Westgate-Greenland et al 1-A Gore, NE NE NW 15-22s-14w, dry, TD 3,878 ft.

Trego County: Stanolind Oil & Gas Co. 1 Benson, SW NW NE 21-12s-22w, dry, TD 4,129 ft.

Central Area

ILLINOIS

Wayne Misener Drilling Co. appears to have uncovered another productive area in northern Clay County where its 1 Van Dyke, NW NE NE 15-5n-6e, is testing good saturation found in both the Rosiclare and

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McClosky zones. Location is about 4 miles west of Bible Grove and a mile west of production in the Hord pool.

Total depth is 2,874 ft. with casing run through the McClosky pay to 2,872 ft. Initial testing is in the McClosky, opposite which casing is perforated at 2,854-62 ft. Swabbing is under way but as this is written no estimate of productivity has been reported. Best saturation was in Rosiclare lime, in which a 90-minute drill-stem test, taking in the section at 2,796-2,803 ft., got gas in 30 minutes and flowed clean oil with a bottom-hole pressure of 1,100 psi.

Bond D. Jones 1-A Tom Mahoney, SW SE SW 21-7s-7e, indicated discovery well 5 miles north of Eldorado, in northeastern Saline County, swabbed at the rate of 15 bbl. of oil per hour natural in initial tests of Cypress saturation at 2,676-84 ft. Since then, the pay has been shot and, as this is written, operators are cleaning out for further testing. The location ¾ mile south of the Hamilton County line, is 1½ miles southeast of the Broughton South pool.

W. L. Griffith and associates 1 Brooks, SE SE SW 22-6n-9e, 4 miles southwest of Newton and a mile northeast of the Bogota pool, in Jasper County, swabbed 9 bbl. of oil with 1 bbl. of water per hour natural from McClosky lime at 3,100-10 ft. in open hole below 3,96 ft. Operators are plugging back to 3,105 ft. and will acidize for additional testing.

Production of the Goldengate Consolidated pool in White County is being extended southward where E. F. Moran 1 Brown NW SW NE 3-4s-9e, flowed at the rate of 14 bbl. of oil per hour from Rosiclare lime at 3,397-3,405 ft., after being given a 4,000-gal. acid injection. The well swabbed 7 bbl. of oil per hour before acidizing. Total depth is 3,461 ft. Casing, perforated opposite the pay zone, is bottomed at 3,444 ft. The area is 7 miles northwest of Crossville.

National Consumers Oil Co. has an indicated Devonian producer for the Mattoon field, Coles County. Its 5 Herkermer, NW NW NE 11-12n-7e, filled 2,670 ft. of clean oil and 150 ft. of oil-cut mud in a 60-minute drill-stem test at 3,157-72 ft. in the Devonian, topped at 3,117 ft. Casing has been run through the pay and will be perforated opposite this zone for completion tests. Location is ½ mile north of the Mattoon city limits in the extreme north part of the field. Other production in the field is from the Cypress, Aux Vases, Rosiclare and McClosky zones. Several wells have been drilled to the Devonian but the present well is the first to find indications of commercial production.

INDIANA

Calvert Drilling, Inc., 1 Knighton, SE NE NE 25-5s-11w, a wildcat located northwest of the Zipp pool, in Vanderburgh County, swabbed an average of 2 bbl. of oil per hour while testing a shallow Pennsylvanian sand at 979-85 ft., and now is being put on the pump for completion. The discovery is being confirmed at 2 Knighton, NE SE NE 25, a location south, which now has casing run to 953 ft. to test the same sand, logged at 956-64 ft. The latter got 170 ft. of clean oil in a 2-hour drill-stem test of the pay.

Charles Clemens has a Hardinsburg sand pumper estimated good for 15 bbl. of oil per day at his 1 Pearl Clemens, NE NE SW 21-1s-9w, west of production in the Oatsville area, northeastern Gibson County. Pay is at 1,290-96 ft. Hole was drilled to 1,410 ft. and plugged back to 1,305 ft.

WESTERN KENTUCKY

Basin Drilling Co. and associates 1, Ramsey, a semi-wildcat located west of Poole in 16-N-23, Webster County, flowed 10 bbl. of oil and an estimated 750,000 cu. ft. of gas per day from a Pennsylvanian sand at 1,395-1,409 ft. Hole had been drilled to 2,783 ft.

Stanford Oil Co. is adding another good McClosky producer in the newly developed north extension area of the active Robards field, southern Henderson County. Its 4 Denton, 19-O-23, pumped 200 bbl. of oil per day with pay at 2,506-12 ft. and 2,514-15 ft. Its 5 Denton, same area, also is testing the same pay at 2,498-2,503 ft.

EASTERN KENTUCKY

In Rowan County, 8 miles southeast of Morehead, the county seat, Irvin Vawter et al have a dry hole at their 2 Smedley wildcat. Objective Corniferous lime was topped at 734 ft. with no shows and the hole has been abandoned at 800 ft.

In Morgan County and 2 miles northwest of West Liberty, John Burns May is drilling at 350 ft. on 1 Lewis, a wildcat 1 mile east of the now abandoned West Liberty gas field. Well is designed to test the Corniferous (Devonian-Silurian) formations.

In Elliott County and on the Sandy Hook anticline, Herchenroeder et al have acidized their 1 Ison and Green and well is reported flowing acid water and oil in, as yet, undetermined amounts. In this wildcat Corniferous lime was topped at 1,292 ft. and penetrated to 1,303 ft. with a good show of oil. Operators continue testing.

MICHIGAN

Sixteen of the last 21 drilling permits issued by the Michigan Department of Conservation were for wildcat oil and gas tests, giving some evidence of a rather active spring and summer here despite the fact that lack of major oil discoveries in the past 4 years has been discouraging. Perhaps the most important of these wildcat starts was the announcement this week by Brazos Oil & Gas Co. of another 7,000-ft. Niagaran test in Chester Township, Otsego County, at the HE-2 State-Chester, C NE SW 10-29n-2w. This is the first follow-up test announced by Brazos to their HE-1 State-Chester, potential discovery oil well which is being tested in dolomite zones in the salt beds above the Niagara at about 6,612-25 ft. The new wildcat is located about a mile northwest of the HE-1 State-Chester. Don Slape Drilling Co. is listed as rotary drilling contractor.

Meanwhile, Brazos was testing at the HE-1 State-Chester after a reacidization with 8,000 gallons. Well still appeared to be short of commercial production following this treatment with average recoveries ranging from 8-20 bbl. of oil and from 10-20 bbl. of acid water by swabbing. Additional potential pays may be perforated and tested at this wildcat.

A Stray sand gas development and well spacing pattern for the Mineral Springs shallow gas pool, Sherman Township, Osceola County, has been agreed to by most or all acreage owners and Mogul Oil Co., this week, announced the location of 4 gas tests which will be drilled immediately. The pattern as now established calls for one well in the center of each quarter section 160-acre unit. First test will be at the Mogul 2 Gas Unit, C SE 20-20n-9w. The others announced were: 3 Gas Unit, C NW 21-20n-9w; 4 Gas Unit, C SW 21-20n-9w; and 5 Gas Unit, C SE, 18-20n-9w. All wells drilled in the current Dundee oil development in Mineral Springs pool, both oil producers and failures, show evidence of Stray gas on an analysis of electrical log surveys of this horizon.

ILLINOIS WILDCAT FAILURES

Hamilton County: Aubrey & Tennant 1 Doland, SE NW SW 26-5s-7e, dry, TD 3,507 ft.

Madison County: George Cassens 1 Hertel, SE SE NW 34-6n-6w, dry, TD 590 ft.

Saline County: Sanders & Fye 1 Mitchell, NW NE NW 2-8s-6e, dry, TD 3,077 ft.

Shelby County: James G. Brown 1 Smith, SE NE SE 23-12n-3e, dry, TD 1,720 ft.

INDIANA WILDCAT FAILURES

Carroll County: Delphi Development Co. 1 Brown, SE SE NE 22-26n-1w, dry, TD 1,078 ft.

Daviess County: F. L. Beard 1 Cornelius, SE NE SW 6-5n-5w, dry, TD 630 ft.

Gibson County: G. H. Pappas 1 Hull, NE SE NE 30-1s-11w, dry, TD 2,350 ft.

John Unger 1 Knapp, NE NW SE 12-4s-11w, dry, TD 2,374 ft.

(Continued on page 177)

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February Completions Down, Following Midwinter Trend, But Exceed 1951

John C. McCaslin

THE usual midwinter slump in drilling and severe winter weather accounted for the drop in total completions for February. A drop in oil, gas, and dry-hole completions brought the total for the month to 3,527, down 547 wells from January. This total is up 810 completions over February 1951, or 29 per cent.

Successful oil wells were down 222 from January's total, but up 430 over February 1951. Gas-well totals were up 32 over last year, but down 39 from January. The number of dry holes drilled in February increased by 348 over last year, but was down 286 from January. The total number of completions for February is the lowest since April 1951.

February vs. January

California.—California chalked up an increase of 21 wells, or 10 per cent. There was a 50 per cent increase in successful wildcat completions. Operators took three holes below 12,500 ft.

North central.—Completions in the Ohio-Kentucky-Illinois-Indiana-Michigan area were down by 100 wells. The area reported a 33-well decrease in oil successes.

Mid-Continent.—The Kansas-Oklahoma-Nebraska area reported a decrease in completions of 188, or 18 per cent. Another successful wildcat was completed in Oklahoma's Panhandle in Beaver County to bring increased interest to that region.

Southern.—Louisiana, Arkansas, Mississippi, and the Alabama-Georgia-Florida sector reported a decrease in well completions of 68, or 22 per cent. Two new oil-producing reservoirs were uncovered and proved in Arkansas.

Rocky Mountain.—The total number of completions for the Rocky Mountain states and the Dakotas was down by four wells. The area reported 10 successful wildcat completions. The Denver-Julesburg and Williston basins were in the February exploratory completion limelight.

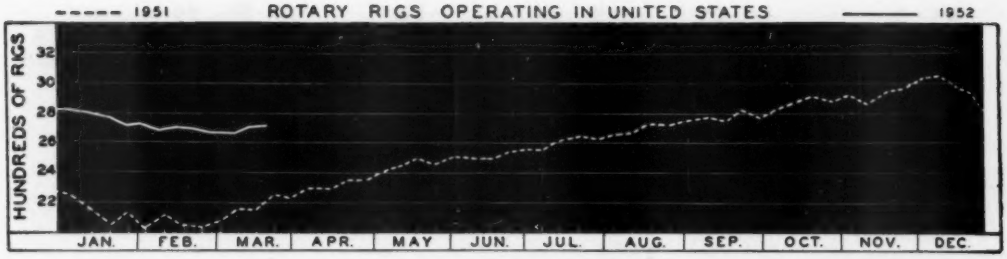
Southwest.—Out in the Southwest Texas and New Mexico reported a decline in completions, down 266. The Georgetown limestone discovery in Houston County, Texas, set off a lease play along the Angelina-Caldwell flexure.

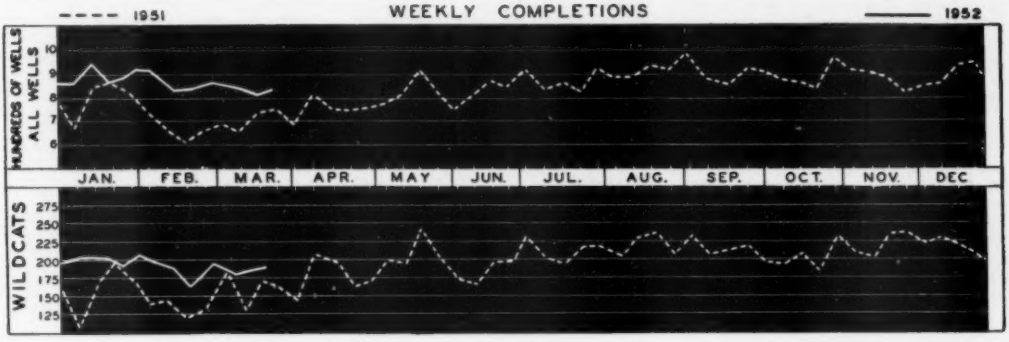
Alberta, Canada.—More than 200 drilling rigs completed wells at the rate of over four daily during February. About 63 per cent of the 117 completions resulted in commercial oil producers. Four discovery-well completions were recorded, three for oil and one for gas. February's total is a 30 per cent increase over last February.

SUMMARY OF COMPLETIONS, FEBRUARY 1952

	Total comp.	Oil	Gas	Dry	Under 2,500 ft.	2,500-5,000 ft.	5,000-7,500 ft.	7,500-10,000 ft.	10,000-12,500 ft.	Over 12,500 ft.	Total footage	Rigs and drilling
New York	60	30	0	30	60	0	0	0	0	0	86,900	52
Pennsylvania	134	60	20	54	110	12	12	0	8	0	310,747	180
West Virginia	58	9	44	5	27	30	1	0	0	0	166,916	198
Maryland	3	0	3	0	0	3	0	0	0	0	12,430	25
Ohio	74	23	18	33	33	41	0	0	0	0	179,485	139
Kentucky	101	37	22	42	68	33	0	0	0	0	192,634	148
Illinois	100	46	0	54	51	49	0	0	0	0	223,569	204
Indiana	73	37	0	36	61	12	0	0	0	0	126,512	153
Michigan	51	19	2	30	29	20	2	0	0	0	123,882	123
Kansas	354	195	13	146	48	297	9	0	0	0	1,205,030	548
Nebraska	18	7	0	11	0	11	7	0	0	0	88,519	29
Oklahoma	470	252	26	192	129	236	79	13	13	0	1,762,554	857
Texas	1,416	858	47	511	299	469	448	156	38	6	6,890,048	1,769
North	236	112	4	120	86	112	37	1	0	0	742,239	189
West Central	197	93	2	102	73	91	33	0	0	0	653,738	210
West	458	370	2	86	41	95	247	54	17	4	2,760,078	720
Panhandle	55	23	17	15	10	39	4	2	0	0	187,697	116
Eastern	78	52	0	26	4	29	29	15	1	0	442,796	110
Gulf Coast	176	99	14	63	11	44	45	59	16	1	1,162,525	243
Southwest	216	109	8	99	74	59	53	25	4	1	940,975	181
Louisiana	163	83	18	62	42	24	27	22	38	10	1,071,217	265
North	92	48	17	27	39	23	19	8	3	0	363,664	95
South	71	35	1	35	3	1	8	14	35	10	707,553	170
Arkansas	34	19	5	10	5	23	3	2	1	0	133,117	33
Mississippi	35	13	0	22	0	2	21	9	3	0	255,047	27
Ala., Ga., Fla.	4	0	1	3	1	1	0	0	2	0	28,644	5
Montana	10	6	0	4	4	4	1	1	0	0	35,590	56
Wyoming	44	25	1	18	4	16	16	7	0	1	237,772	139
Colorado	32	15	3	14	1	9	20	2	0	0	167,637	67
Utah	6	1	0	5	1	1	2	2	0	0	34,549	37
New Mexico	63	31	22	10	17	21	8	10	5	2	327,928	264
California	216	162	4	50	85	72	33	15	8	3	861,578	270
North Dakota	1	1	0	0	0	0	0	1	0	0	8,595	16
Miscellaneous	17	0	0	7	5	2	0	0	0	0	11,503	‡12
Total February 1952	3,527	†1,929	249	*1,349	1,080	1,388	689	240	108	22	14,542,403	§5,616
Total January 1952	4,074	2,151	288	1,635	1,147	1,661	802	298	141	25	17,218,903	5,286
Total February 1951	2,717	1,499	217	1,001	849	1,170	459	146	78	15	10,634,476	4,731
Cumulative 1952	7,601	4,080	537	2,984	2,227	3,049	1,491	538	249	47	31,761,306	....
Cumulative 1951	6,356	3,529	456	2,380	2,034	2,740	1,059	347	153	23	24,535,893	....
Alberta, Canada:												
February 1952	117	74	7	36	15	44	53	4	1	0	524,038	200
January 1952	102	63	7	32	18	27	56	1	0	0	452,190	....
Cumulative 1952	219	137	14	68	33	71	109	5	1	0	976,248	....

*Incl. 105 service wells: N. Y. 30, Pa. 49, Ohio 6, Kans. 2, Okla. 11, N. Tex. 3, Panhandle Tex. 2, N. La. 2, †Incl. 39 condensate wells: Okla. 2, W. Tex. 8, E. Tex. 9, Texas Gulf Coast 12, S.W. Tex. 5, S. La. 2, Calif. 1. ‡Incl. all wells rigged up and/or drilling at month end. §Incl. 1 S. D. at 3,250 ft., 5 Tenn. Total footage 5,387 ft., 1 Mo. at 2,870 ft. ¶Incl. S. D. 3, Tenn. 5, Mo. 1, Idaho, Nev., Ariz. 3.





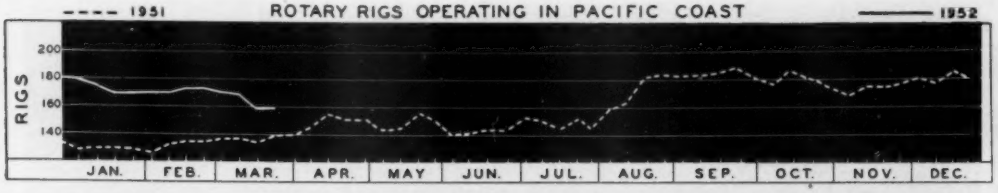
CURRENT STATISTICS

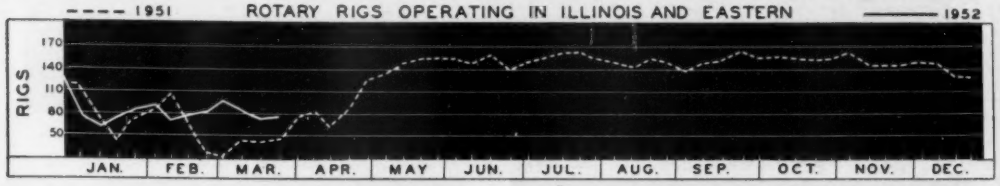
EXPLORATION

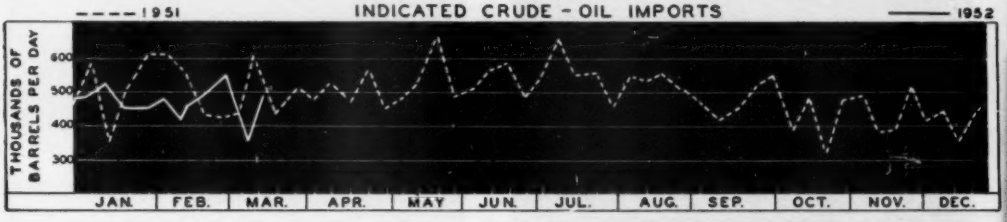
WEEKLY WELL COMPLETIONS . . . WEEK ENDED MARCH 22, 1952

	Total of all wells					Mar. 22		Wildcat completions and discoveries									
													Cumulative total, 1952				
	Comp.	Oil	Gas	Dry	Footage	1952	1951	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	15	7	0	*8	21,700	114	32	0	0	0	0	0	0	0	0	0	0
Pennsylvania	34	15	5	†14	70,000	343	169	0	0	0	0	0	0	0	0	1	1
West Virginia	12	3	7	2	24,201	158	134	0	0	0	0	0	0	0	1	1	2
Ohio	16	3	5	†8	29,418	197	159	0	0	0	0	0	0	0	1	0	1
Indiana	21	6	0	15	35,133	225	197	0	0	0	7	7	10	0	2	77	89
Kentucky	25	10	7	8	54,132	275	170	1	0	0	3	4	8	0	0	43	51
Illinois	20	8	0	12	46,656	321	365	0	0	0	4	4	5	0	0	72	77
Michigan	16	6	1	9	29,591	140	144	0	0	0	7	7	7	0	1	53	61
Kansas	83	38	2	§43	281,812	1,117	887	2	0	0	12	14	23	0	3	183	209
Nebraska	4	1	0	3	22,889	55	70	0	0	0	2	2	2	0	0	31	33
Oklahoma	110	57	2	‡51	397,379	1,447	1,198	4	0	0	12	16	19	1	6	155	181
Texas	347	211	12	124	1,778,478	3,974	3,536	15	5	2	71	93	175	18	25	867	1,085
North Central (Dist. 7-B & 9)	83	42	2	39	302,112	1,215	1,030	10	1	1	25	37	105	1	9	371	486
West (Dist. 7-C & 8)	116	89	3	25	707,132	1,246	1,065	2	0	0	20	22	29	0	1	151	181
Panhandle (Dist. 10)	18	8	2	8	32,348	158	161	0	0	0	1	1	1	0	1	15	17
Eastern (Dist. 5 & 6)	14	7	0	7	77,793	199	239	0	0	0	2	2	7	2	0	48	57
Gulf Coast (Dist. 2 & 3)	59	38	3	18	353,843	592	516	3	2	0	9	14	21	9	5	124	159
Southwest (Dist. 1 & 4)	57	27	3	27	285,250	564	505	0	2	1	14	17	12	6	9	158	185
Louisiana	51	34	3	24	348,986	514	459	1	1	0	9	11	10	4	2	56	72
Northern	26	13	3	10	100,315	284	213	1	0	0	3	4	5	0	2	24	31
Southern	25	11	0	14	248,671	230	246	0	1	0	6	7	5	4	0	32	41
Arkansas	9	6	1	2	38,787	81	85	1	0	0	2	3	3	0	0	11	14
Mississippi	8	2	0	6	57,167	98	53	0	0	0	3	3	4	1	1	38	44
Southeastern States	3	0	0	3	16,038	12	12	0	0	0	2	2	1	0	1	6	8
Montana	0	0	0	0	0	42	36	0	0	0	0	0	2	0	0	13	15
Wyoming	12	5	0	7	80,843	149	149	0	0	0	6	6	8	0	1	26	35
Colorado-Utah	4	2	0	2	18,281	121	56	0	0	0	2	2	7	0	3	37	47
New Mexico	10	5	2	3	35,184	209	160	2	0	0	2	4	7	0	1	17	25
California	42	31	2	9	224,304	574	434	3	0	0	6	9	27	0	0	105	132
North Dakota	0	0	0	0	0	4	0	0	0	0	0	0	1	0	0	2	3
Miscellaneous (Md.)	1	0	1	0	3,182	13	9	0	0	1	0	1	0	0	5	2	7
Total United States	843	440	50	353	3,634,161	10,183	8,516	29	6	3	150	188	319	24	53	1,796	2,192
Total previous week	815	463	75	277	3,391,250			26	0	5	106	137	290	18	50	1,646	2,004
Total March 24, 1951	747	415	62	270	3,113,866			26	3	10	124	163	287	18	58	1,454	1,817

Service wells included: *8, †12, ‡6, §2, ¶1.



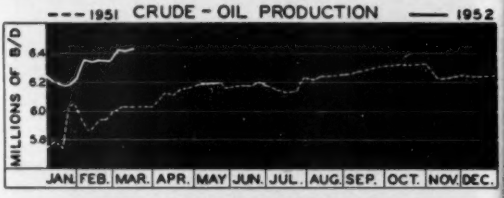


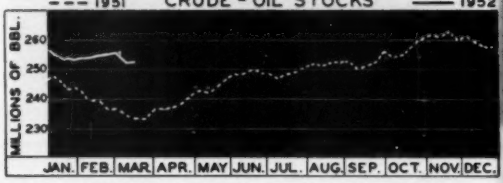


DAILY AVERAGE PRODUCTION FOR WEEK

	March 22, 1952			Mar. 15 total
	Crude oil	Lease condensate	Total	
Alabama	2,700		2,700	2,650
Arkansas	76,675	4,525	81,200	81,000
California	977,900		977,900	977,100
Colorado	83,200		83,200	82,700
Eastern	57,500		57,500	57,000
Florida	1,725		1,725	1,750
Illinois	163,300		163,300	164,300
Indiana	29,000		29,000	30,700
Kansas	333,350		333,350	304,500
Kentucky	34,900		34,900	35,100
Louisiana	627,475	44,950	672,425	672,375
North	113,750	14,950	128,700	128,650
South	513,725	30,000	543,725	543,725
Michigan	39,200		39,200	38,500
Mississippi	95,550	4,500	100,050	105,100
Montana	24,000		24,000	23,500
Nebraska	6,300		6,300	6,300
New Mexico	161,600	450	162,050	162,150
Oklahoma	523,700		523,700	522,900
Texas	2,910,375	47,700	2,958,075	2,958,075
Dist. 1	33,500	225	33,725	33,725
Dist. 2	166,575	3,875	170,450	170,450
Dist. 3	473,675	27,000	500,675	500,675
Dist. 4	268,750	4,700	273,450	273,450
Dist. 5	62,350	450	62,800	62,800
Dist. 6	126,850	4,600	131,450	131,450
East Texas field	265,000		265,000	265,000
Dist. 7-B	88,500	125	88,625	88,625
Dist. 7-C	140,625	5,925	146,550	146,550
Dist. 8	1,041,250	350	1,041,600	1,041,600
Dist. 9	161,175	450	161,625	161,625
Dist. 10	82,125		82,125	82,125
Utah	4,200		4,200	4,300
Wyoming	182,500		182,500	182,000
Total U. S.	6,335,150	102,125	6,437,275	6,412,100
Change from previous week, up			25,175	
Canada	129,350		129,350	118,400

Total U. S. production January 1-March 22 ..... 517,800,595 bbl.
Same period last year (crude plus cond.) ..... 488,918,150 bbl.



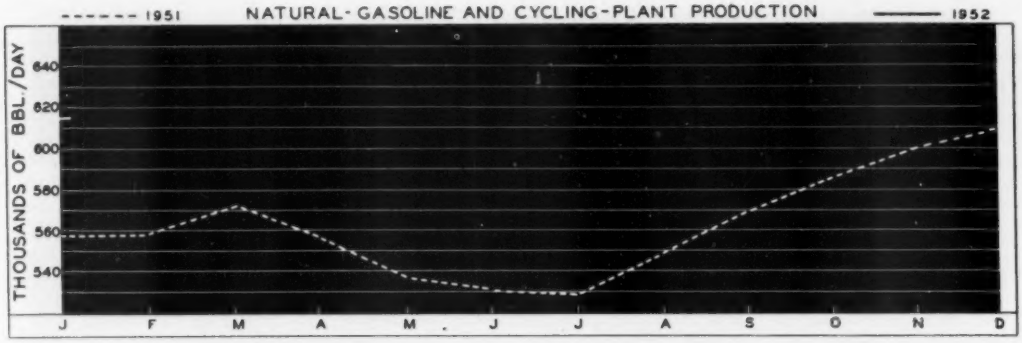


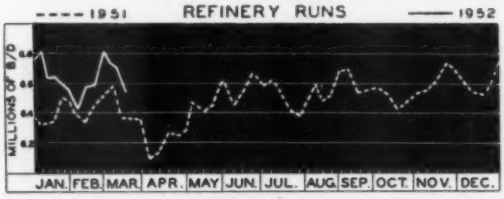
CRUDE-OIL STOCKS BY STATES OF ORIGIN*

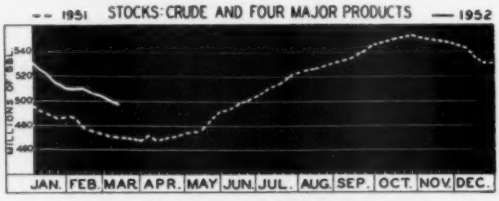
(Thousands of barrels)

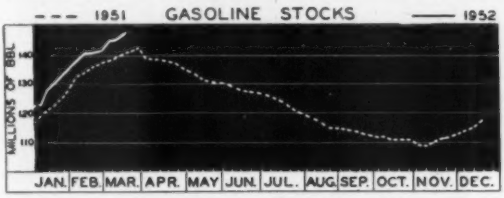
	Mar. 15, 1952	Mar. 8, 1952	Mar. 17, 1951
Pennsylvania Grade	2,272	2,201	2,034
Other Appalachian	2,000	2,168	1,081
Illinois, Indiana, Michigan	11,581	11,030	9,033
Arkansas	2,940	2,804	2,726
Louisiana	13,922	13,558	14,055
North	2,896	2,833	3,084
Gulf	11,026	10,725	10,971
Mississippi	3,395	3,459	2,844
New Mexico	7,650	7,663	7,155
Oklahoma and Kansas	39,102	39,607	37,096
Texas	120,980	120,506	108,820
East Texas proper	10,449	10,654	(†)
West Texas	54,507	54,635	(†)
Texas Gulf	25,263	24,939	(†)
Other Texas	30,761	30,278	(†)
Rocky Mountain	13,442	13,596	12,445
California	30,385	30,702	29,830
Foreign	5,442	5,472	6,001
Total	253,111	252,826	233,115

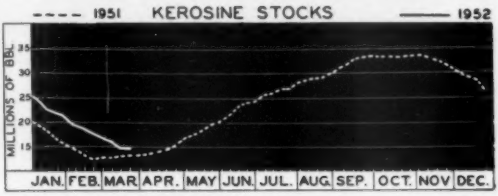
*Bureau of Mines. †Not comparable with current week.

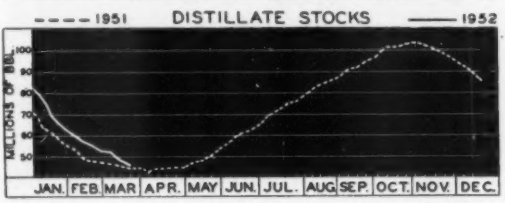


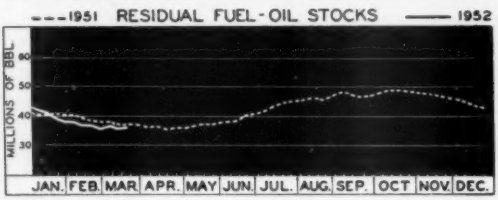










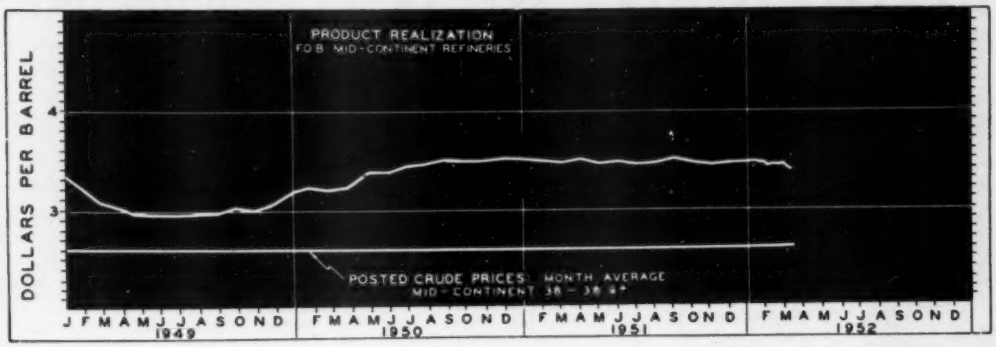


A.P.I. REFINERY REPORT, MARCH 22

(Thousands of barrels

District—	Daily avg. crude runs	Daily average production				Stocks at refineries, bulk terminals, in transit and in pipe lines				Bureau of Mines, March 1951				
		Gasoline*	Kerosine	Distillate	Residual	Gasoline†	Kerosine	Distillate	Residual	Daily avg. crude runs	Daily average production Gasoline*	Kerosine	Distillate	Residual
East Coast	924	393.1	44.7	237.8	216.2	27,136	5,297	12,463	8,787	1,000	371.6	47.0	245.1	235.6
Appalachian:														
District 1	113	49.3	7.4	15.6	17.3	3,343	289	447	367	101	40.3	7.0	15.0	13.4
District 2	73	37.4	4.0	11.3	16.3	1,393	96	361	120	77	32.8	5.4	10.8	18.2
Ind., Ill., Ky.	1,243	616.4	85.6	219.7	170.1	35,406	3,114	7,917	5,081	1,221	592.5	78.9	226.7	186.3
Okla., Kans., Mo.	543	302.9	20.3	124.9	63.3	17,894	990	6,853	1,207	529	274.0	16.5	126.6	75.1
Inland Texas	231	168.0	12.7	38.6	37.1	5,755	281	927	738	237	149.2	15.4	36.7	45.4
Texas Gulf Coast	1,666	762.9	136.1	367.8	273.2	24,497	2,487	6,771	6,508	1,572	688.2	136.0	364.4	274.43
La. Gulf Coast	475	238.6	39.3	142.4	57.0	7,532	1,094	3,164	1,672	486	226.9	65.2	109.1	63.8
N. La. and Ark.	78	33.7	7.7	20.3	4.1	3,231	444	826	151	68	24.8	7.3	17.6	7.8
Rocky Mountain:														
New Mexico	16	9.6		1.7	3.6	147		56	31	13	7.2	.3	2.5	3.2
Other Rocky Mtn.	220	106.0	9.0	44.6	43.1	5,871	270	1,296	960	222	103.6	7.5	41.2	47.1
California	960	399.0	7.9	138.7	362.3	15,391	236	5,105	10,472	943	396.5	12.6	131.0	377.3
March 22, 1952	6,542	3,116.9	374.7	1,363.4	1,263.6	147,596	14,598	46,188	36,604	6,469	2,907.6	399.1	1,326.7	1,347.5
March 15, 1952	6,693	3,108.0	353.1	1,459.9	1,283.0	146,165	14,941	47,972	36,054					
March 24, 1951	6,380	2,861.1	374.1	1,278.7	1,388.6	141,239	13,032	43,626	37,327					

*At refineries including natural blended. †Finished and unfinished.


PRODUCT REALIZATION
F.O.B. MID-CONTINENT REFINERIES
DOLLARS PER BARREL
4
3
POSTED CRUDE PRICES, MONTH AVERAGE
MID-CONTINENT 38 - 38.9°
J F M A M J J A S O N D
1949
F M A M J J A S O N D
1950
F M A M J J A S O N D
1951
F M A M J J A S O N D
1952

In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate, and fuel oil. Realization averaged $3.37 for week ended March 15, $3.39 for previous week, and $3.49 for March 1951. The above trend information is based on volumes and current prices and therefore does not reflect changes in operating costs.

REPRESENTATIVE QUOTATIONS

Representative spot-market quotations of leading suppliers as of March 26, 1952. Figures are f.o.b. plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Texas Gulf Coast
Regular gasoline, 80-82 octane	10-10¼	12-12.75	10¾-11
Premium gasoline, 86-88 octane	11-11⅜	13.5-13.75	11¾-12
42-44 w.w. kerosine	8⅞-9⅛	10-10.1	9
No. 2 straw fuel oil	8-8¼	9-9.25	8
No. 6 residual	$1.40-1.50	$2.45-2.60	$1.75-1.90

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	5½	5	5¼
Grade 18-53	6.6	6.1	6.35

LUBRICATING OILS

South Texas

300 vis., No. 2-3 neutral	13-13.5
750 vis., No. 3-4 neutral	16
2,000 No. 5-6 neutral	18-19

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	29
200 vis., No. 3 neutral, 0-10 pp.	16.5-17.5

Western Pennsylvania

145-155 vis., 10 p.t. bright stock	32.5
180 vis., 0 p.t. neutral	31.5

WAX

Mid-Continent

132-134 A.M.P.	5.5

GENERAL market conditions in the Mid-Continent and North Central areas can be summed up by a midweek comment: "Things don't seem to be much worse than they were at this time last week." This condition represented an improvement over the widespread softening of inland markets since the first of the year.

There have been reports of proposed movement of light fuels from North Central areas to Canadian markets normally supplied out of the New York Harbor area by shipments up the river and through the canal. Such a movement would help clean up the excess stocks in District 2.

At the middle of March, kerosine and distillate stocks in the Illinois-Indiana refining district were 1,300,000 bbl. greater than last year. In addition to this excess, the lack of balance in supply and demand for light fuel in the inland areas backed up stocks in the Mid-Continent to give a surplus of 1,700,000 bbl. over same date last year.

Lack of material for open trading in kerosine and distillate fuel in New York Harbor has prevented completion of contracts for normal movement of fuels to Canadian markets. Since the Office of Price Stabilization promised an over-all review of heating-oil ceilings on the East Coast, suppliers are not releasing material for open trading under current ceilings. On the other hand, Canadian buyers do not want to make contracts based on market prices in May or June, since there is nothing to indicate what changes will be made in East Coast ceilings.

OPS has asked East Coast suppliers and distributors to file suggestions on ceiling revisions required to assure adequate supplies next season. These suggestions are to be sent to OPS by April 1. OPS is also asking tanker owners for suggestions on calculating probable average transportation costs as a basis for establishing price differentials between Gulf Coast and East Coast ceilings.

Marketers report softening of L.P.G. prices, particularly in the Mid-Continent and in Texas.

CRUDE PRICES

GRAVITY SCHEDULE

	Signal Hill, Calif.‡	Oklahoma, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$1.93	....	....	....
19-19.9	1.98	....	....	....
20-20.9	2.03	$2.25	....	$2.15
21-21.9	2.07	2.27	....	2.14
22-22.9	2.12	2.29	....	2.16
23-23.9	2.18	2.31	....	2.18
24-24.9	2.24	2.33	$2.56	2.20
25-25.9	2.30	2.35	2.58	2.22
26-26.9	2.36	2.37	2.60	2.24
27-27.9	2.41	2.39	2.62	2.26
28-28.9	2.46	2.41	2.64	2.28
29-29.9	2.52	2.43	2.66	2.30
30-30.9	2.57	2.45	2.68	2.32
31-31.9	2.62	2.47	2.70	2.34
32-32.9	2.68	2.49	2.72	2.36
33-33.9	....	2.51	2.74	2.38
34-34.9	....	2.53	2.76	2.40
35-35.9	....	2.55	2.78	2.42
36-36.9	....	2.57	2.80	2.44
37-37.9	....	2.59	2.82	2.46
38-38.9	....	2.61	2.84	2.48
39-39.9	....	2.63	2.86	2.50
40 and above	....	2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point.

†Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947.

‡Standard Oil Co. of California.

FLAT CRUDE PRICES

Representative posted schedules per barrel.

Kettleman Hills, California*	$2.80
Louisiana:	
Beauregard Parish	2.60
Cotton Valley (distillate)	2.85
Cotton Valley (crude)	2.70
Texas:	
East Texas	2.65
Pecos County (Yates)	2.30
Conroe	2.53
Van	2.48
Pennsylvania Grade:	
Bradford	4.25
Southwest Pennsylvania	3.82
West Virginia	3.76
Illinois Basin	2.77

*37°-37.9°.

EQUIPMENT MEN . . . in the News

Mid-Continent Names Three New Store Managers

T. R. FLEEMAN

According to an announcement by Ken W. Davis, president and general manager, Mid - Continent Supply Co., Tommie R. Fleeman, field salesman at Snyder, Tex., has been promoted to store manager.

T. F. Schmidt, from Mid-Continent's Houston store, has been promoted to store manager at Falfurrias, Tex., and F. M. Wilson has been promoted from field salesman at Elk City, Okla., to store manager at the same location.

Fleeman replaces C. D. McIver, who has been transferred to Abilene, Tex.,

T. F. SCHMIDT

F. M. WILSON

as store manager. Fleeman was first employed by Mid-Continent at the Rangely, Colo., store in 1947. In 1948 he was transferred to Hobbs, N. M., and in July of the following year was moved to the Snyder store.

Schmidt came to work for Mid-Continent in 1948 at the Houston store. In 1949 he was transferred to the New Iberia store. In 1950 he moved to the Falfurrias store as field salesman. He went back to Houston in 1951 as telephone sales and Unit Rig parts man.

Associated with Mid-Continent since May 1948, Wilson was first employed in the Pauls Valley store. In May 1950 he was transferred to the Elk City store when it was opened. In August of the same year he was promoted to field salesman. In January 1952 he was promoted to store manager in Elk City.

Whitney Leaves Klemp Metal Grating Corp.

Lee Shelley, president of Shelley Steel Corp., Chicago, has announced that Emerson C. Whitney is no longer president of William F. Klemp Co., Chicago.

Shelley Steel Corp. purchased the entire assets of William F. Klemp Co. in November 1951. Lee Shelley was made chairman of the board at that time and the name was changed to Klemp Metal Grating Corp.

Continental Promotes Winters to New Post

E. N. Wood, district manager of The Continental Supply Co. at Shreveport, recently announced the appointment of L. L. Winters as district drilling equipment representative.

Winters will concentrate on the sale of drilling equipment in Arkansas, North Louisiana, Mississippi, and East Texas. He is well qualified for his new duties through supply-store experience, which began at Coleman, Tex., in May 1926. Since that time Winters has worked as floorman, assistant store manager, salesman, and store manager. His position prior to the new appointment was store manager at Natchez, Miss.

Oil Capitol Supply Opens New Borger Warehouse

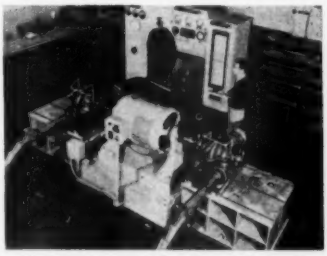
Tom Word, president of Oil Capitol Supply Co., Tulsa, has announced the opening of a new Borger, Tex., warehouse to serve that area with its complete line of equipment and supplies. W. W. (Comp) Compton has moved from Tulsa to become district manager of the Borger store. Max Bryan (Swede) Swenson, well known in the Borger area, is store manager and his assistant is D. L. Lane.

Taking Compton's place in the Tulsa store is Ralph Randle, long-time supply-store salesman.

Centrifugal Test Stands Installed by De Laval

De Laval Steam Turbine Co., Trenton, N. J., has recently completed a series of newly designed centrifugal-pump testing stations which have reduced over-all test costs 75 per cent during a 12-month trial period.

These stations are engineered to give a complete reproduction of performance for pumps of all sizes and ratings. Although they are primarily



De Laval test stands are permanent installations consisting of a double-ended electric dynamometer mounted on a hydraulic lift located between two prealigned pump bedplates.

designed for production testing, they have also proven valuable in research and development processes for new designs.

A detailed analysis of all test data assembled over the first 12 months' operation has shown a direct reduction in testing time and a saving of man-hours that has effectively cut testing costs to 25 per cent of the previous established cost. To De Laval and to industry, the new test stations offer a means of obtaining trouble-free proven pumps that fit given system heads.

Oil Capitol Supply Co.'s Borger warehouse.

W. T. Powell, right, vice president, Emsco Derrick & Equipment Co., demonstrates controls of the new Emsco J-1100 rig to Fred Mayer, president of Continental Supply Co., at Emsco plant.

Jack Mussler, general manager of sales, Continental, and Robert A. Snyder, vice president, New Bedford Cordage Co., inspect New Bedford cordage at the Emsco plant.

H. H. Peters, right, vice president, Technical Oil Tools Co., points out new Toico equipment to Frank Brinegar, executive vice president of Continental Supply Co.

Shown on the plant tour are Bill Kinder, vice president, Emsco D+B Division; Marcel Ricaud, Continental's agent associated with S.I.E.C.A. in Algiers, North Africa; C. J. DeLay, manager of the export department, New York City; Pierre Maillet, engineer with S. N. Repal, Algiers, North Africa; Julio Zumeta, executive manager of the export department at New York; and Hans Fraenkel, New York representative of S.I.E.C.A.

Continental Holds Twelfth Sales Meeting at Houston

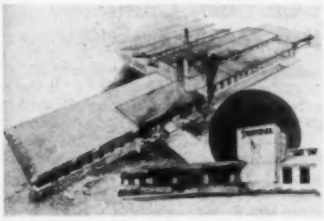
According to an announcement by Fred Mayer, president, Continental Supply Co., the firm held its twelfth annual sales meeting March 24 to 25 at Houston. Although principal business meetings were scheduled at the Rice Hotel, conferees were taken on extensive tours of Emsco Derrick & Equipment Co.'s Houston plant, the Continental warehouse at Houston, and the Broderick & Bascom plant.

During these tours, Continental personnel had an opportunity to examine new equipment displayed by manufactures represented by Continental, and to inspect manufacturing facilities

Stratoflex, Inc., Moves To New Fort Worth Plant

The board of directors of Aeroquip Sales & Engineering, Inc., has announced a change in the name of the company to Stratoflex, Inc., and the relocation of general offices, laboratory, and factory facilities at Fort Worth.

Included in the statement by the board of directors was an announcement of the following officers for Stratoflex, Inc.; K. W. Davis, president; J. E. Everroad, executive vice president; S. R. Billingsley, vice president engineering; W. R. Cook, vice president sales; N. E. Barber, secretary-treasurer; H. E. Reese, assistant secretary, and J. D. Willis, purchasing agent. All of the new officers had held positions with the old firm prior to the name change. Stratoflex, Inc., offices, other than the Fort Worth headquarters, are at Houston and Odessa, Tex.; Birmingham, Kansas City, and Wichita.



An architect's sketch of the new Stratoflex plant.

United Drilling Services Is Bowen's Canadian Agent

Paul Bowen, president of Bowen Fishing Tool Co., recently made a trip to Canada and completed arrangements for United Drilling Services, Edmonton, Alta., Canada, to maintain a rental stock of Bowen fishing tools and specialties and to handle sales of Bowen tool parts.

H. E. Snelson, owner and manager of United Drilling Services, is well qualified to represent the Bowen company in this area, having spent several years in Canada with Hughes Tool Co.

G. G. Guiberson Elected Guiberson Corp. President

GUIBERSON

Gordon G. Guiberson, until recently chairman of the executive committee of The Guiberson Corp., was elected president of the company at a recent meeting of the company's board of directors. The announcement by Executive Vice President Alex P. Smith stressed Guiberson's long experience in every phase of the oil industry.

In addition to his recent duties as

chairman of the executive committee, Guiberson has in the past served the corporation as vice president and general manager and as sales manager.

Officers of the corporation who will assist the new president are: S. A. Guiberson, Jr., chairman of the board; Alex P. Smith, executive vice president; Allen Guiberson, vice president; N. G. Guiberson, vice president; William F. Neale, vice president; A. J. Wallis, secretary; C. H. Ballard, treasurer; T. V. Terry, assistant secretary-treasurer.

Guiberson's board of directors, headed by Chairman S. A. Guiberson, Jr., is made up of Gordon G. Guiberson, Allen Guiberson, William F. Neale, Alex P. Smith, and S. Austin Wier.

Columbia-Southern to Make Drilling-Mud Additives

Columbia-Southern Chemical Corp. will be in full-scale commercial production of two new products, Hydrotan and Hydrocarb, with 3 months at its Corpus Christi, Tex., plant, according to an announcement by E. T. Asplundh, president.

The products are designed for treatment of oil-well drilling muds. Oilfield use during the past 18 months indicates that the new products will afford safer drilling control and more economical operation.

Production of Hydrocarb will relieve United States drilling operators of dependence upon Argentine-produced quebracho.

Hydrotan controls the viscosity of drilling mud and by being a colloid adds other desirable properties in the process.

Mid-Continent Supply Makes Store Manager Appointments

Ken W. Davis, president and general manager of Mid-Continent Supply Co., recently announced the transfer and appointment of John E. Ryan, former field salesman at Hobbs, N. M., to Oklahoma City store manager; Max L. Hancock, from field salesman at Odessa, Tex., to store manager at Hobbs, N. M.; Billy J. Hickman to store manager at Duncan, Okla., and A. Z. Day to new store manager in Sterling, Colo.

JOHN E. RYAN

MAX L. HANCOCK

BILLY J. HICKMAN

A. Z. DAY

Ryan began working for Mid-Continent in the Kermit store in 1949. He was transferred to Hobbs in September of that year and was promoted to field salesman in Hobbs in 1950.

Hancock first went to work for Mid-Continent in 1948, at Sundown, Tex. In 1949 he was transferred to Snyder, Tex., and the following year was promoted to field salesman. In 1951 he assumed new duties as field salesman at Odessa, Tex.

Hickman went to work for Mid-Continent in 1948 at Duncan, Okla. He was made field salesman in 1950 at the same store. In June 1950 he was promoted to store manager at Elk City, Okla., where he remained until his recent transfer to store manager at Duncan.

Day's career with Mid-Continent began in 1948 at Sundown, Tex. In June of the same year he was transferred to Fullerton. He moved to Hobbs in 1949 and to Casper, Wyo., as field salesman in 1950.

Crider Is National Supply Division Sales Manager

Appointment of Hugh A. Crider as sales manager of The National Supply Co.'s Southwest division has been announced by Allen F. White, Jr., division manager. Crider succeeds R. L. Waller, who recently resigned.

HUGH A. CRIDER

In his new assignment, Crider will supervise sales activities for National Supply's 20 stores in northern Louisiana, southern Arkansas, East Texas, North Texas, West Texas, New Mexico, and the Panhandle. The division, with headquarters in Fort Worth, was created in June 1951, when the former Texas division was subdivided.

Crider has been associated with National Supply since 1933, when he joined the company as a store clerk in Beaumont, Tex. He later served as a field salesman at Corpus Christi, Tex., and New Iberia, La., and store manager at Benavides, Tex., and Bunkie and Houma, La.

In 1941 he was named assistant manager of the Odessa, Tex., district and in 1944 was promoted to manager. He was transferred to the Fort Worth division office as assistant to the division manager in 1947.

Glass Fibers Opens New York Branch Office

Glass Fibers, Inc., Toledo, has announced the opening of a branch sales office in the Chrysler Building in New York City.

Robert V. McCallister has been named as New York branch sales engineer. Other Glass Fibers branch sales locations are at Chicago, Los Angeles, Toledo, Detroit, Dallas, and Washington, D. C.

(Continued on page 177)

Baash-Ross Texas Gulf Coast Men Hold Conference

At a recent conference of the Baash-Ross sales personnel operating in the Texas and Gulf Coast areas were: H. Z. (Zeke) Browning, Corpus Christi; George Cook, Houston; Charles Laudermilk, Shreveport; Cecil Laws, Houston; Gene Buckner, New Iberia; Ken Jones, Houston; Albert Schoettlen, Houston; John Terry, Houston, Gas Engine Division; J. L. Barnett, Jr., Houston; E. J. Frederick, Houston; and E. M. Gearke, Houston. Gearke is general sales manager for all of the Baash-Ross operations served by the 17 manufacturing plants and service shops in the United States.

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FOR SALE: 6⅝" OD Used Line Pipe—50,000′ ft. 18.97# Single Random, Plain End Beveled. Stock, immediate shipment. Utility & Industrial Supply Company, P.O. Box 409, Jackson, Michigan.

FOR SALE: 300′ of 13⅜" OD 8 Round J-55 Casing Couplings, New. 5000′ of 8⅝" OD 8-V Line Pipe Couplings, Used. American Pipe & Supply Company, Casper, Wyoming.

400—6" LONG and 400—8" Long—5" OD 8 V Thd. Used Casing Couplings. Will sell or trade for pipe. Jack Waller, Box 863, Longview, Texas.

Gaso Duplex 4½" x 6" Power Pumps with Chrysler C-36 Engines, skid mounted, immediate delivery. Also Byron Jackson, Carter Centrifugal Units. Westinghouse 20-25-50 KW Generating Units.

H. H. COFFIELD
Attn.: W. H. ORR
Phones: 132—Rockdale, Texas
AT-3417—Houston, Texas

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Good Used 48-L and 36-L Bucyrus-Erie Drill with or without Tools.

Beacon Supply Co.
Box 399, Pampa, Texas Phone 3377

Reconditioned Seamless TUBING

1½" O.D.
2" O.D.
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Approximately 5 miles or more of each size available in single or double random lengths, plain ends, beveled for welding.
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PIPE
All sizes; line pipe and casing, tanks, and Oilfield supplies. Edco Pipe & Supply Co., Phone 45970, P.O. Box 151, Tulsa, Oklahoma.

THREE Buda Engines 4′ cylinder 3½" bore; 4½" stroke, Model H-173. Brand new and complete less clutch. Cost $640, take $240 each. Box E-669, The Oil and Gas Journal, Tulsa, Okla.

FOR SALE: Our Sasakwa Gasoline Plant only, "no field lines" now ready for disposal. Inventory and price available upon request. Cities Service Oil Company, Patridge, Bartlesville, Okla.

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36-L Bucyrus-Erie Spudder, Trailer Type complete tailing in tools for 5" and 7" pipe—New 3500′ lines ⅞" and ¾"—Steel Dog House—Junk Rack—Forge—1500 W Koeler Light Plant—Everything propane equipped. Contact **Herbert H. Hart, 2266WI, El Dorado, Kansas, or Charles V. Cross, 125 Madison, Kansas.**

PIPE FOR SALE

20,000′ 2⅜" O.D. 4.00# Lapweld Tubing & Rods.
50,000′ 6" O.D. 10# Lapweld PE Pipe.
50,000′ 6⅝" O.D. 13# Lapweld Casing T&C.
9,000′ 12¾" O.D. 42# PE Lapweld No. 1 Used Pipe.

FRANK MORRIS & CO.
424 So. Cheyenne Phone 2-6247
Tulsa, Oklahoma

EQUIPMENT FOR SALE

FOR SALE: Well Drilling Business—71-Star, Modernized #3 Keystone, Both Truck Mounted. Complete Tools, 4 to 20 inch. Physical Inventory $15,000. Nets $6,000 to $8,000 yearly. This is Industrial—No Pipe Worries. Sales Price: $11,000.00. Owner retiring. Write Box E-394, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: Westcott, Foxboro and Emco Gas Meters. George R. Milner, Box 124, Okmulgee, Oklahoma.

FOR SALE: Two 55,000 barrel, steel deck, riveted tanks, located Ranger, Texas. Call H. H. Coffield, 132, Rockdale, Texas.

FOR SALE

100,000′—6⅝" O.D. #1—13# L.W. Casing
25,000′—5½" O.D. #1—14# L.W. Casing
200,000′—2⅜" O.D. #1—4# L.W. Tubing

for immediate delivery.
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FOR SALE

#1—RECONDITIONED USED LINE PIPE

200,000′—6⅝" O.D., .280" wall, 18.97#
300,000′—8⅝" O.D., .322" wall, 28.55#
All 20 to 23′ Random Lengths

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SER. 30 WELD NECK FLANGES
1", 1¼", 1½", 2", 2½", 3", 4", 5", 6", 8"
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ACME VALVE & FITTINGS CO.

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EQUIPMENT FOR SALE

VALVES: Gate valves from refinery, rising stem 4" each $30, nonrising stem 4" for $25, rising stem 6" each $35, nonrising stem 6" for $30, some other sizes. Also master valves, control heads, pump jacks, upset tubing. Good used equipment. Everything for well service. Pressey & Son, Pueblo, Colo.

1 MODEL "K" Cardwell Double Drum Spudder. 145 GK Waukesha Motor. Skid mounted. ¾" Drilling 9/16" Sand Lines. These lines are 4000'. Tools for 7" and 5½" Hole. Hand Tools Tubing & Rod Tools Complete. Butane Tank, Steel Dog House. This Rig has Folding floor and Roof. Gaines Drilling Co., Box 547, El Dorado, Kansas. Phone 2317.

FOR SALE: 723 used Victaulic couplings and gaskets for 6⅝" OD spiral weld line pipe. Price $1.59 each. 256 used Gustin Bacon-Groovagrip couplings and gaskets for 8⅝" OD spiral weld line pipe. Price $2.06 each. The Drillers Gas Company, 24 West 8th Street, Hutchinson, Kansas.

FOR SALE: Wilson Giant Drawworks: 2 Buda JL-1335 Motors with chain compound drive. 1—Code Butane Tank. 4000' 4½" Drill Pipe. May be inspected while drilling 4000' wells near Hays, Kansas. Total price $17,000.00. Powell Drilling Company, 306 Derby Bldg., Wichita, Kansas.

FOR SALE: Wilson Giant Rig complete with 2 250 H.P. Cummings Diesel Engines compound; 96 foot Hi Speed Lee C. Moore Mast; 4000 feet nearly new Drill Pipe; 7¼ x 14 Pump, measuring lines, etc., complete ready to drill. Box E-668, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE

One six hundred barrel red wood tank—One five hundred barrel—One three hundred barrel gun-barrel and two two hundred and fifty barrel tanks and one one hundred barrel. Also have about three thousand feet of two and three inch pipe for sale. Please call P. C. Dressler, McLouth, Kansas.

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100,000 gallon capacity, 34 feet diameter, 20 foot high. In good condition.

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WAbash 2-4911

EQUIPMENT FOR SALE

FOR SALE: Wilson Giant Draw Works with 2-JL-1335 Buda Motors compounded, motors recently overhauled and in A-1 condition. Total price $7,500.00. Glenn R. Nye Drilling Company, Drawer 30, Telephone 897, Hays, Kansas.

FOR SALE AT BARGAIN: Heavy Duty Pumping Unit for handling large volume fluid. Parkersburg J-53-30, double reduction Herringbone gear reducer complete with Buda JL-877 Standard unit with accessories. Motor newly reconditioned. Unit about seven years old but actually in use only short time. First class condition. Now located near Cromwell, Oklahoma. Wrightsman Oil Company, 218 First National Bank Building, Holdenville, Oklahoma.

FOR SALE: EMSCO G-300 drilling rig with 6000' OD drill pipe—6 regular drill collars, 3 F. H. drill collars/EMSCO 96' portable mast/6 ft. steel substructure/7¼" X 12" Gardner-Denver pump—new light plant—all necessary equipment to drill to a depth of approximately 6000'—must be seen to appreciate—this rig in very good condition, priced for a quick sale at $70,000.00 F.O.B. Northeast Texas—Phone #435 Mineola, Texas, or write Box 285, Tyler, Texas.

7500' OF API Full Hole 4½" Drill Pipe. Graded and tested by Sonoscope engineers. Milford Giffin, Giffin Hotel, Tel. 477, Hoisington, Kansas.

1 MODEL RL Cardwell Double Drum Spudder with 145 GK Waukesha Motor mounted on Mud Boat. New wire lines, ⅞" Drilling and 9/16" Sand Lines. These lines are 4500' long. Tools for 7" and 5" holes. All Tubing and Rod Tools complete. Big 6 locker Dog House, Butane Tank and Junk Rack. Junk rack also mud boated. This unit has folding walks and Roofs. Canvas goes around unit to house it in for winter. This Unit is complete as far as hand tools and other tools are concerned. Gaines Drilling Co., Box 547, El Dorado, Kansas. Phone 2317.

ROTARY RIG, Wilson Mogul Gardner 7¼x10 Pump, 65 Mast, 38 Kelly, 32 DC., Rotary, Swivel, etc., $16,000. Box E-690, The Oil and Gas Journal, Tulsa, Okla.

SHOT HOLE RIG for Sale: Franks K.C. 45 on 1946 Chev. truck. Dodge Water truck, 1951. 200 ft. of drill pipe. Call or write E. E. Hubbard, 1206 N. 11th St., Garden City, Kans. Call 4926.

FOR SALE: 3A National Cable tool machine with JL. 1335 Buda Engine and Youngs Drilling Clutch. Price $5000.00. C. L. Hinds, Box 194, Ulysses, Kansas.

10—8000 GAL. steel 12x10' tanks, vert. open top ¼" plate, have ⅜" plate to enclose end, like new, painted outside, clean and free from rust on inside. Hepperly Equipment Co., 4900 West Madison Street, Chicago, Illinois.

WANT EQUIPMENT: Did you find the equipment you wish to purchase in this column? If not, use an "Equipment Wanted" classified advertisement to find it. It is available somewhere and Journal classified advertisements will find it. See box heading for classified rates, or write The Oil and Gas Journal.

SIMPLEX STEAM PUMPS
CLOSE CLEARANCE—SIDE POT

2—Worthington "Hi-Vol" 8 x 4 x 12
4—McGowan 10 x 8½ x 18
1—Union 12 x 7 x 12

NATIONAL TRANSIT

2—8 x 4¾ x 6
2—6 x 4¾ x 12
2—6 x 4 x 12
2—6 x 5 x 12
1—4½ x 3 x 6
3—12 x 8½ x 18 (Ace Type)

DEAN

2—8 x 7 x 18
1—10 x 9 x 18
1—14 x 9 x 18

MAJORITY IN SERVICE LESS THAN 1 YEAR

IN STOCK: OVER 200 STEAM & CENTRIFUGAL PUMPS

VICTORY SUPPLY CO., INC.

Box 754 Phone 5-9235

Tulsa, Oklahoma

EQUIPMENT FOR SALE

FOR SALE: Approx. 3000' of 3½" modified drill pipe, 1 Wichtex Draw-works, 65' mast, 1 17" Oil well Rotary table, 1 C-100 Ideal 6¼" x 10" mud pump complete with motor, 1 PA-100 International Draw-works motor, 1 GMC truck 2½ ton tandem, 1 Ford truck 1½ ton, both oilfield beds & winches. Have all other equip. necessary for complete rig that isn't listed. Rig now working, price, $27,500.00. F. H. Graves, 805 W. Main, Marietta, Oklahoma. Phone 430.

EQUIPMENT WANTED

HIGHEST prices paid for Cable Tools, Machines, Equipment, Pipe and Supplies. Degen Pipe & Supply Co., Box 107, Redfork Station, Tulsa, Oklahoma.

WANTED: Two Pumps (diesel drive) 20,000 GPM or larger, 10 ft. total head. Delivery April. A. V. Konsberg, 21 E. Van Buren St., Chicago, Illinois.

1,400 FEET or less 3½" EUE or 2⅞" EUE drill pipe, new or good used. One 30 foot 4¾" drill collar, new or good used. Have PAD authorization for pipe. Box E-806, The Oil and Gas Journal, Tulsa, Oklahoma.

WE BUY well drilling equipment, machines, cable tools, pipe, etc. Turn your surplus equipment into cash. Pressey & Son, Pueblo, Colorado.

WILL PAY highest prices for used casing, used line pipe, abandoned leases, or other surplus lease equipment. Your idle producing equipment is worth dollars. Green Pipe & Supply Co., Box 1383, Tulsa, Oklahoma.

WANTED TO BUY: Used Failing 314C or Failing 1500 drill—send price and full description to Box E-672, The Oil and Gas Journal, Tulsa, Oklahoma.

EQUIPMENT NOT IN USE: Did you find a buyer in this column for the equipment you have for sale? Someone wants it and an "Equipment For Sale" classified advertisement in the Journal will find a buyer. See box heading for classified rates or write The Oil and Gas Journal.

WANTED FOR CASH

Oil Well Type Motors in ratings 15/30-20/50-25/65 or 35/75 Horsepower. Will buy other type motors.

ALLIED ELECTRIC & MACHINERY CO.

1007 Falls Bldg., P.O. Box 1838

Memphis 1, Tenn.

HELP WANTED

FOR SOUTH AMERICA: Micropaleontologist. Seismologist. Graduates in Geophysics, mathematics or physics to train as seismologists. Experienced Graduate Drilling Engineer. Experienced Graduate Reservoir Engineer. No fees. Oil Industry Employment Service, 405 Tuloma Bldg., Tulsa, Okla. 4-5974.

WANTED

ALERT, INTELLIGENT YOUNG MAN TO SERVE AS ACCOUNTING SUPERVISOR

We want a man to take charge of Accounting Department employing 8 persons. We are in the Oil Production and Drilling Contracting business serving Oklahoma and Texas. The prime requisite for this job is ABILITY TO ORGANIZE PERSONNEL, SUPERVISE THE DEPARTMENT and in general act as OFFICE MANAGER. SALARY OPEN. CHANCE FOR ADVANCEMENT EXCELLENT. Write letter giving full background and qualifications. Appointment will be arranged.

BOX E-692

THE OIL AND GAS JOURNAL

Tulsa, Oklahoma

HELP WANTED

EXPERIENCED gravity party chief-supervisor for foreign service. Top salary and expense allowance. Family can accompany. Our personnel have been notified. Apply Box E-660, The Oil and Gas Journal, Tulsa, Oklahoma.

KEY Seismograph Personnel Needed by Established and Expanding Seismograph Company. Box E-618, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Interpreter. Minimum five years' experience. Must have excellent references. Permanent location. Top money. Communications confidential. Central Exploration Co., Inc., P. O. Box 3005, Capitol Station, Oklahoma City, Oklahoma.

COMPUTER—College degree and two years of experience as Computer and Observer on seismograph crew. To be given intensive training toward position of Party Chief. Write us giving full details of education and experience and salary expected Geotechnical Corp., Box 7168, Dallas, Texas

CABLE TOOL DRILLER: Good steady job for experienced man that can deliver. Bucyrus-Erie 24-L drill, some 6" work, some 9" to 20" pump and ventilation holes—must be straight, run pull and repair 12" and 14" turbine pumps with the drill. Work all daylight, 60 hour week 6 days and the job paid over $7500.00 last year. Good rock drilling with a little shale on top, 250' to 350' holes. Write Judd & Son, Shullsburg, Wisconsin.

WANTED: Experienced, reliable Observer. Must have excellent references. Top money. Location in Kansas or Nebraska. Communications confidential. Central Exploration Co., Inc., P. O. Box 3005—Capitol Station, Oklahoma City, Oklahoma.

EXPERIENCED surveyors for foreign service with gravity crews. Top salary, subsistence, travel expenses. Our personnel have knowledge of this ad. Apply Box E-661, The Oil and Gas Journal, Tulsa, Oklahoma.

JOBBER SALES ENGINEER

Integrated oil company in Middle West has excellent opportunity for qualified applicant. Position requires at least three years of sales work, preferably in oil industry. College degree in M. E., C. E., or Physics required. Applicant should have knowledge of machinery and internal combustion engines and be willing to travel. Age 28-35. All replies should contain salary required and recent photograph. Box E-680, The Oil and Gas Journal, Tulsa, Okla.

FOREMEN

PRODUCTION AND CONNECTION

Major company has openings in Venezuela for experienced Production and Connection Foremen. Age 26-40, five years' minimum experience. Working knowledge of Spanish desirable.

WRITE P. O. BOX #35
BOWLING GREEN STATION
NEW YORK 4, NEW YORK

HELP WANTED

ADMINISTRATIVE and field sales personnel. Engineering education and/or background necessary. Knowledge of petroleum and chemical industries desirable. Apply: The J. B. Beaird Company, Inc., P.O. Box 1115, Shreveport, Louisiana.

EXPERIENCED seismic personnel interested in domestic or Canadian employment wanted by expanding major contract company. Opportunity for advancement and better-than-average salaries. Box E-673, The Oil and Gas Journal, Tulsa, Okla.

GRADUATE Chemical Engineers and Chemists for positions in Research and Development department, located in Tulsa. State qualifications and salary expected. Write Personnel Department, P.O. Box 381, Tulsa, Oklahoma.

WANTED: Combination Safety Engineer and Metal Inspector. Southwest Refinery. Box E-681, The Oil and Gas Journal, Tulsa, Oklahoma.

NOW READY. List showing where to apply for foreign oil jobs. Write for price. OIML Co., Box 2603, Tulsa, Okla.

GEOLOGIST to organize, and to direct Geological Department for exploration, and production Div. now being organized, for a well established Natural Gas Co. Must be thoroughly familiar with South Louisiana, and also experienced in North Louisiana, Mississippi and East Texas, and capable of handling the geology in other areas in which the company may want to expand. Salary commensurate with ability and job to be done. Office in New Orleans, Louisiana. Box E-645, The Oil and Gas Journal, Tulsa, Oklahoma.

THE POSITION YOU WANT: Oil industry companies are looking for men to fill every conceivable kind of position. If you didn't find the position in this column that you are looking for, use a "Situation Wanted" classified advertisement to state your qualifications. Some company is probably looking for your ability. See box heading for classified rates or write The Oil and Gas Journal.

SITUATIONS WANTED

REFINERY Superintendent, experienced 5,000 to 10,000 bbl. plants, desires connection with independent refinery. Box E-696, The Oil and Gas Journal, Tulsa, Oklahoma.

COMPETENT graduate petroleum engineer with 5½ years' major company experience in drilling, completing, producing, and reworking oil and gas-condensate wells on Gulf Coast and in East Texas, desires responsible position with established independent or consultant. Box E-694, The Oil and Gas Journal, Tulsa, Oklahoma.

ATTENTION: Well established oil well drilling contractor desires to manage and supervise individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas, and New Mexico Personal interview by appointment is desired. Makin Drilling Company, Box No 1628. Ph. No. 131, Hobbs, New Mexico.

PRODUCTION man, twelve years experience, Drilling Completion, Workover, some secondary recovery. Now employed, desires change. Can give references, 37 years of age. Box E-671, The Oil and Gas Journal, Tulsa, Oklahoma.

HELP WANTED

OPPORTUNITIES FOR TECHNICAL REFINERY PERSONNEL for LARGE INTERNATIONAL OIL COMPANY

Entertaining applications of graduate chemical, mechanical, structural and electrical engineers for refinery engineering assignments at home and abroad.

Engineers with refinery experience and also recent graduates will be considered.

Box E-667, The Oil and Gas Journal, Tulsa, Oklahoma

SITUATIONS WANTED

DO YOU need the services of a petroleum engineer? An experienced engineer desires a good retainer fee to begin practice as a consultant. Box E-682, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM Engineer with several years production experience, desires job where he can get into reservoir engineering work. Box E-683, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED land man's job, especially qualified for work in West Texas. Also, qualified to handle well completion and production. Box E-684, The Oil and Gas Journal, Tulsa, Oklahoma.

SEISMIC Interpreter - Geologist — Eight years experience desires position with permanent location and opportunity for advancement. Box E-687, The Oil and Gas Journal, Tulsa, Oklahoma.

PRODUCTION MANAGER. Petroleum Engineer-Geologist. 38. Experienced land and leasing, negotiating drilling deals and contracts, and management drilling and producing operations in Kansas and Rocky Mountains. Desire responsible connection with active and financially sound operator. Box E-679, The Oil and Gas Journal, Tulsa, Oklahoma.

REFINERY manager or superintendent—desires connection with progressive independent oil refiner. Eighteen years' experience in construction, operation, and maintenance. Age thirty-eight. Box E-693, The Oil and Gas Journal, Tulsa, Oklahoma.

PIPING Design Draftsman or leader with fifteen years' extensive experience in all departments of Petro-Chemical Plant design. Experience covers flow sheet and plant layout, pressure vessel design, control equipment, estimating, etc. Box E-695, The Oil and Gas Journal, Tulsa, Okla.

INSURANCE MANAGEMENT — Position desired with industrial or commercial firm by CPCU—15 years' experience—will move. Box E-691, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR MID-CONTINENT REFINERY Graduate Chemical Engineer with 14 years process engineering and operations supervision in modern refineries. Available for independent refiner undertaking modernization. Box E-697, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM Engineer with equivalent degree desires responsible assistant executive, administrative, supervisory position. 27 years experience (exp.) reservoir studies, production, drilling, small refinery, equipment, inventory. Box E-699, The Oil and Gas Journal, Tulsa, Oklahoma.

THE RIGHT MAN: Can you fill the position you have open from the qualifications listed in this column? Men are always looking for an opportunity to improve themselves. Use a "Help Wanted" Journal classified advertisement to find the men you need. See box heading for classified rates or write The Oil and Gas Journal.

LEASE AND DRILLING BLOCKS

WILL pay cash instantly for leases (large blocks), royalties, mineral deeds, production. Write fully—P. O. Box 2153, Denver, Colorado.

FOR SALE: Lea Co., New Mexico. Subject to prior sale, 80 acres of leased, deeded minerals are offered. S.E.¼ S. 8.—Tw. 11 S.—R. 36 E. Priced at $250.00 per acre. This offer is good for 60 days only. No private listing. P. O. Box 1724, Long Beach 1, Calif.

WE invite inquiries from persons interested in Oil and Gas Leases in Southern Alberta, North Central Montana and the Williston Basin. Box E-664, The Oil and Gas Journal, Tulsa, Oklahoma.

THE American Legion, Department of Texas, offers for lease to the highest bidder mineral rights southeast quarter, Section 31, Block A L and SV RR CO. Survey, Reagan County, Texas. Submit bids to Ralph Holman, chairman, board of trustees, the American Legion, Department of Texas, Suite B-1 Commodore Perry Building, Austin, Texas, on or before noon, Wednesday, April 23, 1952. Board of trustees reserves right to cancel all bids. Attest, G. Ward Moody, Adjutant.

LEASE AND DRILLING BLOCKS

FOR SALE: All proven leases in individual shoestring field Eastern Kansas. Part now producing. High gravity oil. Major pipeline connection. Good sand body. Suitable for secondary recovery. Box E-698, The Oil & Gas Journal, Tulsa 1, Oklahoma.

10,000 ACRES on gravity high in South Georgia. I can supply gravity survey map on this acreage to party interested in drilling deal or finance a drilling program. The Tuscaloosa sand has been drilled in Georgia with good oil shows. It's producing in Alabama, why not try Georgia? A good deal to use some tax money with excellent chance for shallow oil and gas production. Gas seepage on good structure. T. R. Davis, 700 Mosley St., Vidalia, Georgia.

FOR SALE: Bargain! 70 acre new 10 year lease, Shelby County, Texas, $5 per acre. C. A. Parker, Polley Hotel, Center, Texas.

INVESTMENT funds wanted—From excess taxpayers by independent oil operator. For exploratory well drilling immediately. Geologically favorable. Illinois basin. Box E-569, The Oil and Gas Journal, Tulsa, Oklahoma

FOR SALE
OIL BONUS

Under Major oil company's very large, well located lease. For information write

Box E-655, The Oil and Gas Journal, Tulsa, Oklahoma

LEASES ROYALTIES
Producing and Nonproducing
Bought and Sold—Any Area
Inquiries Invited
B. D. BUCKLEY
6631 Delmar Ave., St. Louis 5, Mo

WANTED TO BUY

real oil production from owners only Won't assume overriding royalty. Please quote net price. Principals only.

Box E-670, The Oil and Gas Journal, P. O. Box 1260, Tulsa, Okla.

NORTH DAKOTA
LEASES and MINERALS

Our latest lists with prices mailed on request. We solicit only those connected with the Oil Industry, or Royalty business. References exchanged.

JOHN ALLEN
200 Grand Pacific Hotel Phone 3850
Bismarck, North Dakota

GET IN ON A "MAJOR" PLAY!

Major Oil Companies and a large number of progressive independents are making a great lease play in certain areas of Western Kansas, and we have some well located leases and royalties right in with and under the big company spreads. Here is the small man's chance to be in on the ground floor of a 'big company' play. Write us for full details.

ACACIA OIL & ROYALTY CO.
1365 East 52nd Place,
Tulsa, Oklahoma

LEASE AND DRILLING BLOCKS

OIL, Mining Leases, options wanted. Prefer up to $1 an acre. Apt. 9R, 405 E. 54th St., New York City.

FOR SALE: Four oil and gas leases in shallow territory, two large leases excellent for water flooding, all in Allen County, Kentucky. Buel Wilson, Box 184, Scottsville, Ky.

WANTED: Producing Oil Royalties and Overrides, Large or Small, Any County, Any State, pay you right off. Wire—Write—Call, Jack Eagle, 311 City Nat'l Bldg., Okla. City, Okla. Phone—REgent 6-7027.

NEW MEXICO Oil and Gas Leases for sale. 2100 Acres, Chaves, Eddy, Roosevelt, Valencia Counties. Box E-651, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR a limited time NEW CAPITAL for operators or for purchase. If you have production and need new "easy term" working capital to refinance obligations, drill more wells, expand, or desire to sell, contact us for details. In reply don't give details—merely state size of lease, number producing wells, daily pipe line runs and whether prorated. Don't sacrifice before you contact us. Box E-624, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: Oil and Gas Leases and Drilling propositions in Shallow territory of South Central Kentucky. Logs of wells furnished. W. P. Harley, Bowling Green, Ky.

UINTAH BASIN: 16,000 acres government leases for sale, adjacent huge Major Co. block. Also offer 640 acres, Montana, 116 bbl. settled daily production. 1950 ft. 23 proven locations undrilled. W. H. Smart, 345 Milton Ave., Salt Lake City, Utah.

LOOKING FOR A LEASE? There will be over 40,000 wells drilled this year. If you are looking for a lease, drilling block, or drilling deal and haven't found it in this column, or if you have a lease or drilling block you want drilled, a Journal classified advertisement can find an interested party. See box heading for classified rates, or write The Oil and Gas Journal.

ROYALTIES

MONTANA ROYALTIES
Millions of acres now leased by world's major companies, with huge drilling play in prospect. For booklet describing Montana geology and oil development, write Landowners Royalty Company, Box 1225, Great Falls, Montana.

GET TOGETHER: Both Capital and Royalties are available. If the investment proposition you want isn't listed in this column, use a Journal classified advertisement to find it. See box heading for classified rates, or write The Oil and Gas Journal.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington 25, D. C. Notice is hereby given that two parcels of land in T. 12 N., R. 12 W., La. M., containing approximately 159.62 acres, within the known geologic structure of the DeSoto field, undefined, Louisiana, will be offered for oil and gas leasing through competitive bidding to the qualified bidder of the highest cash amount per acre, at 1 p.m., Eastern Standard Time, on April 30, 1952, when bids will be opened. Details of the lease offering and how and where to file bids may be obtained by addressing an inquiry to this office. Marion Clawson, Director.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington 25, D. C. Notice is hereby given that two parcels of land in T. 32 N., R. 82 W., 6th P.M., Wyoming, containing approximately 320 acres, within the known geologic structure of the Iron Creek field, will be offered for oil and gas leasing through competitive bidding to the qualified bidder of the highest cash amount per acre at 1 p.m., Eastern Standard Time, April 23, 1952, when bids will be opened. The details of the lease offering and how and where to file bids may be obtained by addressing an inquiry to the Manager of the Land and Survey Office, Cheyenne, Wyoming, or to this office. Marion Clawson, Director.

LEGAL BLANKS

BURKHART LEGAL BLANKS since 1908. Oil-Gas (all states), Business, Real Estate, Legal Forms, Leases, Revised With Government Regulations, Commercial Printing Catalog and Samples on request. Burkhart Printing & Stationery Company, 115 South Cincinnati, Tulsa, Oklahoma.

BUSINESS OPPORTUNITIES

INVENTOR of long Stroke Pneumatic Hydraulic Pumping and Drilling Unit with U. S. and foreign Patents issued, wants good reliable Licensee, One Unit is successful for any depth for pumping and drilling. Answer, Calvin W. White, 200 W Armour Blvd., Kansas City, Mo.

REAL ESTATE

WINTERGARDEN IRRIGATED RANCH

An exceptionally good investment; lease it for cash, or operate it; raise two head cattle per acre, year round grazing, or three bales cotton acre plus $1,000 acre winter vegetables. Offering 565 acre irrigated farm in Texas Wintergarden Area, best climate in Texas. Water supply of great worth, four large irrigation wells, excellent water, only 31 feet of lift, INEXPENSIVE IRRIGATION. U.S.G.S. rates water supply one of the best. Soil: alluvial loam, very rich, very deep, recently cleared. Scenic: mile Leona River frontage. Deer, wild hogs, turkey, quail, squirrel, fishing. Borders beautiful Leona Lake. Perpetual springs, good flow now during area's worst drought. Hard surfaced highway, electric power, telephone. A well known traveled university professor in agronomy rates it "best I have ever seen." Farm presently rented $35.00/acre. Selling to settle estate, at $350.00/acre, ⅓ cash. Buyer can continue to lease, rental will more than make note payments. Minerals intact, not leased, seismic survey now in process by major. Some authorities predict such exceptionally good farm in this area will soon command $1,000/acre. Part owner: Homer I. Henderson, Old Pearsall Road, Uvalde, Texas.

BEAUTIFUL SAN ANTONIO

Pleasing Spanish architecture in an imposing setting of over 2½ acres, this magnificent home will please the most fastidious. Wide central hallway, graceful double stairway, paneled library, spacious living room with imported handwoven rug tailored to fit, beautiful dining room (with exquisite suite and rug) served by stainless steel butler's pantry and tile kitchen; breakfast room; splendid game room; exceptional powder room, tiled porch and patio overlooking expansive lawn. Splendid! Five bedrooms with excellent closets and three bathrooms. Master bedroom has private lounging room, bath, dressing room, numerous closets and store rooms and elevator. Four car garage with servants' quarters. This magnificent home, only ten years old, first time offered, for $175,000.00 (this is far below replacement cost) will be shown by appointment to qualified buyers. Joe S. Sheldon, Milam Building, San Antonio, Texas.

SPACE IS NEEDED: A Journal display classified advertisement is the quickest way to rent or sell your real estate. In the present period of expansion oil industry firms urgently need the space you have available. If it isn't listed here, you may also find it by stating your needs in these pages. For classified rates see box heading or write The Oil and Gas Journal.

REAL ESTATE

Geophysical office building in Fort Worth, Texas, for sale at attractive price. Ideal for geological service, oil operators, mud-conditioning service or drilling activity. Located on east Lancaster (Dallas, Fort Worth Highway) but very close in to business district in Fort Worth. This ultra-modern office has reception room, private office with built-in files and book case, brilliant drafting room and laboratory with ample closets. Garages and car port attached to rear of building. Contact Mr. Dyer at McDonald and Company, Dan Waggoner Building, Phone FA 6345, Fort Worth, Texas.

EQUIPMENT MEN

(Continued from page 172)

Worthington Names Hood To Vice Presidency

C. K. HOOD

According to an announcement by W. H. Feldman, vice president in charge of sales, Worthington Pump & Machinery Corp., has elected C. K. Hood, formerly manager of the corporation's New York district sales office, to a vice presidency. He will be responsible for the direction of the activities of the public works, steam-power deaerating, water treating, and steam-turbine divisions and will report to T. Cruthers, vice president.

Hood, a graduate of Iowa State College, started his career with Worthington in 1918 and has been manager of the New York district sales office since 1930.

W. J. Van Vleck, present manager of the corporation's Atlantic district sales office, will succeed Hood as manager of the New York district sales office. C. W. Kramer, resident general line salesman in Birmingham, will succeed Van Vleck as manager of the Atlanta office. I. W. Leggett, general line salesman at Charlotte, N. C., has been appointed manager of the Charlotte branch office.

Central Area

(Continued from page 164)

Sullivan County: Ray Redifer 1 Drake, NE SE NE 33-9n-10w, dry, TD 860 ft.

Ray Redifer 1 Scott, SW NE NE 21-7n-10w, dry, TD 924 ft.

F. B. Cline 1 Vail, NE NE SW 8-8n-10w, dry, TD 1,400 ft.

WESTERN KENTUCKY SUCCESSFUL WILDCAT

Henderson County: Sinclair Oil & Gas Co. 1 Eblin, N½ SW SW SE 20-P-21, IP 305 bbl., McClosky 2,612-23 ft., TD 2,643 ft. (extension Midway pool).

WESTERN KENTUCKY WILDCAT FAILURES

Daviess County: Stanford Oil Co. 1 Cooper, NW SE NW 9-O-26, dry, TD 2,331 ft.

Henderson County: Ashland Oil & Refining Co. 1 Tapp, SE SW NW 2-N-22, dry, TD 2,815 ft.

EASTERN KENTUCKY WILDCAT FAILURE

Rowan County: Roy Davis et al 1 Coffee, 8 miles east of Morehead, dry, TD 912 ft., Corniferous lime 812 ft.

MICHIGAN WILDCAT FAILURES

Allegan County, Allegan Township: William J. Morris 1 Ter Avest, N½ N½ NE 16-2n-13w, Traverse 1,516 ft., dry, TD 1,760 ft.

Valley Township: Cook Drilling Co. A-1 U.S.A., SE NE SE 29-2n-14w, Traverse 1,306 ft., dry, TD 1,395 ft.

Kalamazoo County, Prairie Ronde Township: L. C. MacGregor 1 Calvert, NW NW NE 31-4s-12w, Traverse 1,139 ft., dry, TD 1,164 ft.

Oceana County, Benona Township: McClure Oil Co. 1 Usiak, NW NE SE 12-14n-18w, Traverse 1,759 ft., dry, TD 1,788 ft.

St. Clair County, Burtchville Township: Burley O. Bunker 1 Gilbert & Woods, NE NW SW 8-8n-17e, Dundee 777 ft., dry, TD 1,180 ft.

Van Buren County, Bangor Township: Norman L. Stevens 1 Carpenter, NW SW NE 4-2s-16w, Traverse 1,042 ft., dry, TD 1,045 ft.

Porter Township: W. D. Gannett 1 Papich Waite Comm., NW NW NW 7-4s-13w, Traverse 1,033 ft., dry, TD 1,060 ft.

ADVERTISERS IN THIS ISSUE

A-1 Bit & Tool Co.	88, 89
Aerotec Corporation	12
Air Reduction Magnolia Company	4
Armstrong Machine Works	137
Baash-Ross Tool Company	159
Baird Mfg. Co.	142
Baker Oil Tools, Inc.	147, 150
Bechtel Corporation	139
Bethlehem Steel Co.	1
Brewster Company, Inc., The	17, 18
Byron Jackson Co.,	21
Cable & Staples	150
Cameron Iron Works, Inc.	Front Cover
Cardwell Mfg. Co., Inc.	116, 117
Chain Belt Co.	32
Chemical & Geological Laboratories	143
Chicago & Southern Air Lines	153
Clark Brothers Co., Inc.	41
Classified Advertising	173, 174, 175, 176
Coates Field Service, Inc.	138
Cooper-Bessemer Corp., The	68
Cooper, Inc., Fred E.	119
Coppus Engineering Corp.	3
Crane Co.	7
Crose Manufacturing Co., Inc., M. J.	141
Dean Brothers Pumps, Inc.	156
De Laval Steam Turbine Co.	25
Detroit Diesel Engine Division, General Motors Corp.	40
Dowell Incorporated	130
Drilling & Service, Inc.	158
Empire Trust Company	148
First National Bank & Trust Co. of Tulsa, The	155
Flint Steel Corporation	134
Fluid Packed Pump Company	111, 112
Fluor Corporation, Ltd., The	121
Gar Wood Industries, Inc.	110
Garrett Oil Tools, Inc.	96
General Electric Company	10, 11
Gilmer Company, L. H.	149
Goodall Rubber Company	128
Goodrich Chemical Company, (Hycar)	71
Grancell, I. H.	142
Guiberson Corporation	105
Halliburton Oil Well Cementing Co.	Inside Front Cover 19, 33
Harbison-Fischer Mfg. Co.	146
Hazard Wire Rope Division of American Chain & Cable Co., Inc.	Inside Back Cover
Hinderliter Tool Co., Div., H. K. Porter Company, Inc.	52
Hughes Tool Co.	Back Cover
Inferno Co., The	134, 136
Johns-Manville Corporation	26
Johnston Testers, Inc.	42
Jones & Laughlin Steel Corp.	36
Jones & Laughlin Supply Co.	24
Kerotest Manufacturing Co.	45
Kinzbach Tool Co., Inc.	153
Koch Engineering Company, Inc., The	135
Koppers Company, Inc.	23
Lane-Wells Company	48
Layne & Bowler, Inc.	6
LeBus Rotary Tool Works, Inc.	108
Leland Equipment Co.	46
Le Roi Company	14, 15
Le Tourneau, Inc., R. G.	8, 9
Levingston Shipbuilding Co.	47
Lone Star Cement Corporation	50
Lufkin Foundry & Machine Co.	27
Magnet Cove Barium Corp.	154
Maloney-Crawford Tank & Mfg. Co.	29
Marsh Instrument Co.	20
McCord Corporation	136
Minneapolis-Moline	22
Mission Mfg. Company	161
Modern Engineering Co., Inc.	156
Moore Co., Inc., Russell F.	136
Murphy Diesel Company	2
Mutual Chemical Company of America	152
National Airoil Burner Co., The	138
National Supply Co., The	91, 92, 93, 94
National Tank Company	178
National Tube Company	37
Nicolet Industries, Inc.	158
Oil and Gas Journal, The	140
Oil Center Tool Co.	72
Oil Well Supply Co.	30, 31
Oklahoma Contracting Co.	140
Otis Pressure Control, Inc.	115
Parkersburg Rig & Reel Co.	5
Perrault Brothers	138, 147
Pioneer Rubber Co., The	136
Price Company, H. C.	100
Rector Well Equipment Co., Inc.	143
Reed Roller Bit Company	124
Refinery Supply Co., The	137
S & R Tool & Supply Co.	153
Safety First Products Corp.	113
Sawyer & Son Co., The H. M.	47
Second National Bank of Houston	162
Spang-Chalfant Division of The National Supply Co.	92, 93
Spicer Mfg., Div. of Dana Corp.	120
Standco Brake Lining Co.	149
Thermix Corporation, The	12
Thermoid Company	125
Thornhill-Craver Co.	28
Trackson Company	16
Twin Disc Clutch Co.	43
Underwood Corporation	157
Union Wire Rope Corporation	38, 39
U. S. Steel Corp., Subsidiaries 30, 31, 37,	144
United Supply & Manufacturing Co.	151
Universal Atlas Cement Co.	144
Williams Valve Co., The D. T.	13
Willson Products, Inc.	44
Wilson Supply Co.	34, 35
Wolverine Tube Division, Calumet & Hecla Consolidated Copper Co., Inc.	126
Wood's Sons Co., T. B.	140
Wright Chemical Corporation	163
Youngstown Sheet and Tube Company	67
Zelgson Truck and Equipment Company	164

LEGAL

18,549.59 ACRES of Tribal Indian lands located in Townships 4 and 5 South, Ranges 2, 3, and 4 West, USBM, on the Uintah and Ouray Reservation, Utah, are being advertised for oil and gas lease, bids on which will be opened April 17, 1952, at 2:00 P.M., at the office of Forrest R. Stone, Superintendent, Uintah and Ouray Agency, Fort Duchesne, Utah. Full particulars may be obtained from the office of the Regional Oil and Gas Supervisor, U. S. Geological Survey, Casper, Wyoming, or from the Uintah and Ouray Agency.

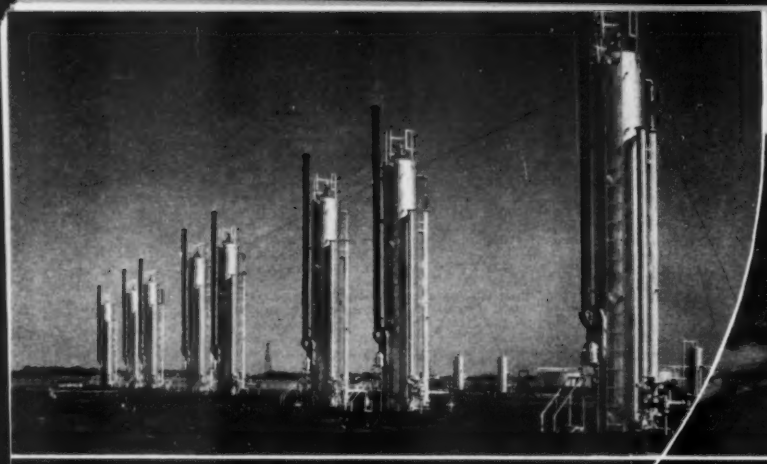
LEGAL

U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington 25, D. C. Notice is hereby given that 200.09 acres in T. 35 S., Rs. 29 and 30 W., 6th P.M., Kansas, within the known geologic structure of the East Adams Ranch field, undefined, will be offered for oil and gas leasing, through competitive bidding to the qualified bidder of the highest cash amount per acre, at 1 p.m., Eastern Standard Time, April 16, 1952, when bids will be opened. Details of the lease offering, how and where to file bids, and a description of the lands may be obtained by addressing an inquiry to this office. Marion Clawson, Director.

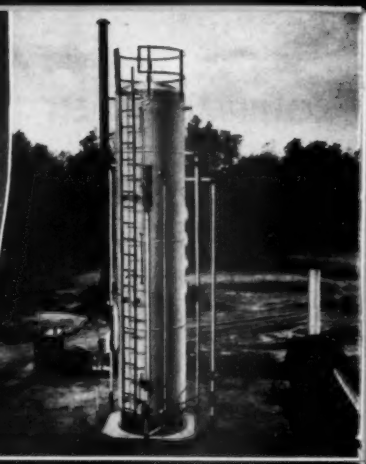
LEGAL

U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington 25, D. C. Notice is hereby given that four tracts of land totaling approximately 1019.03 acres, in Ts. 129, 130 and 131 N., R. 106 W., 5th P.M., North Dakota, within the known geologic structure of the Cedar Creek field, will be offered for oil and gas leasing, through competitive bidding to the qualified bidders of the highest cash amounts per acre, at 1 p.m., E.S.T., April 16, 1952, when bids will be opened. The details of the lease offering and how and where to file bids may be obtained by addressing an inquiry to this office. Marion Clawson, Director.

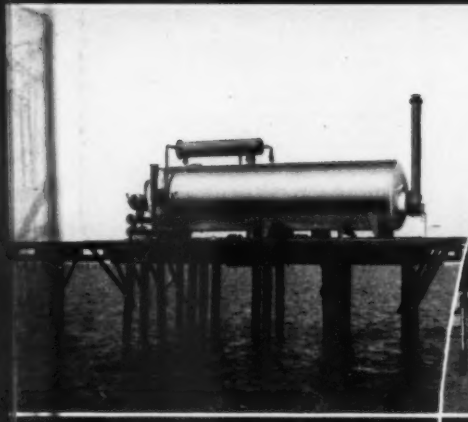
TABLE OF CONTENTS ON PAGE 51



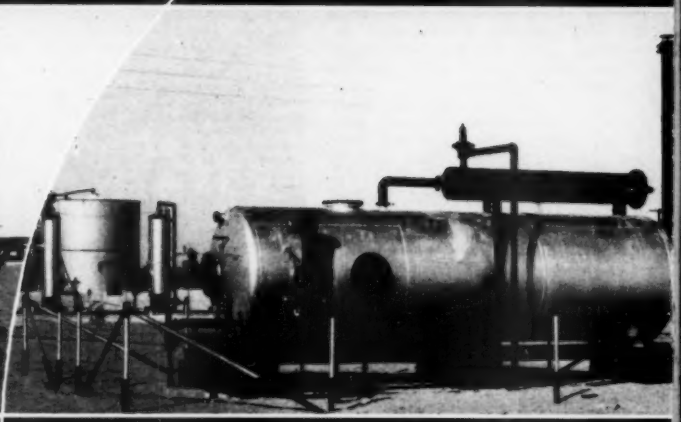
8 — 4′ x 27′ 6″ ICP Emulsion Treaters



6′ x 27′ 6″ XCP Emulsion Treater



8′ x 27′ 6″ Horizontal Treater on Offshore Location



6′ x 20′ Horizontal Treater

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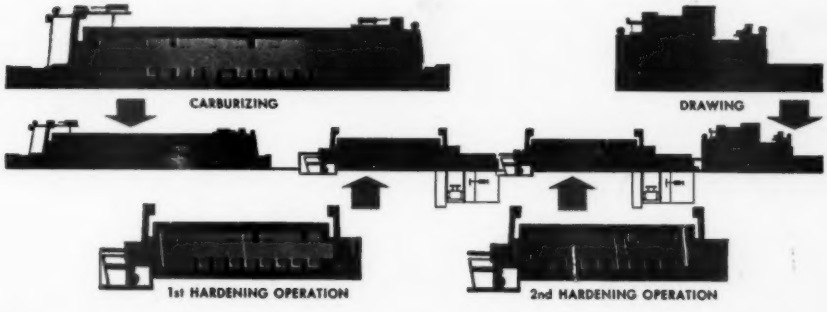
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